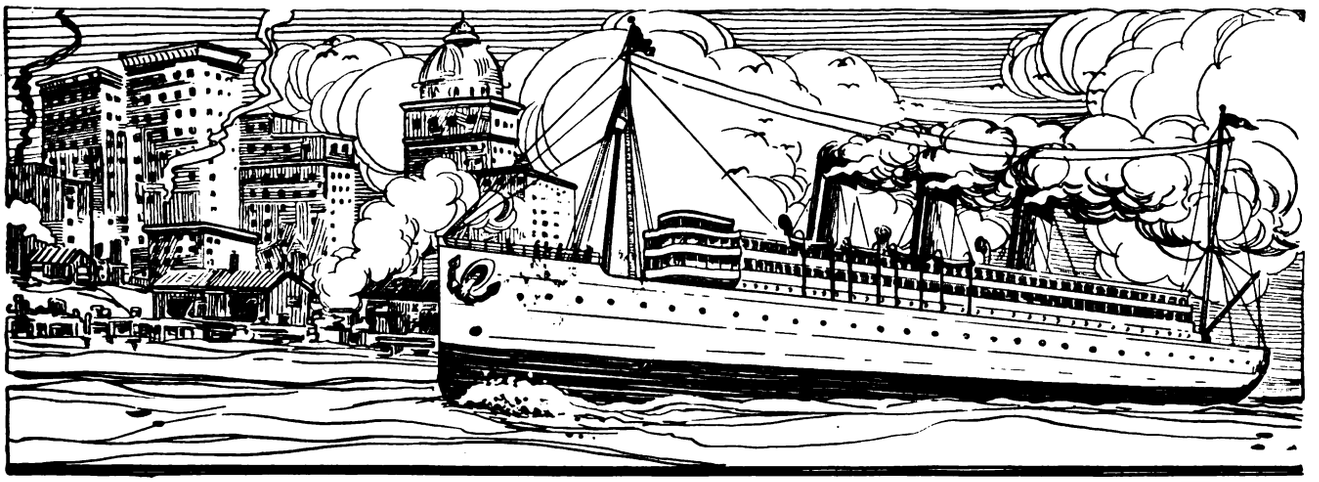

CLEVELAND—NEW YORK, MAY, 1916

THE MARINE REVIEW

A Monthly Publication Devoted to Ship Building, Marine Engineering and the Business of Transportation by Water.

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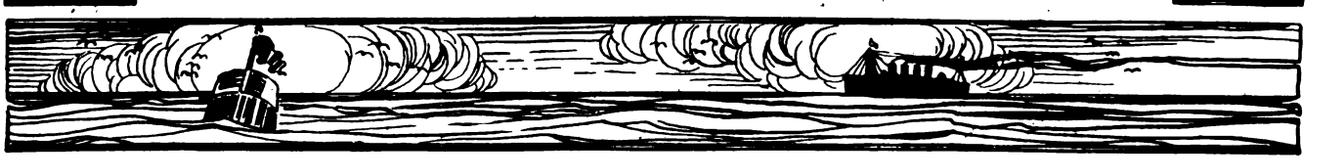

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THE MARINE REVIEW

VOL. 46 CLEVELAND MAY, 1916 NEW YORK No. 5

How the Seamen's Law Really Works

Facing Greatest Season in History, Ship Owners on Coasts and Lakes Are Hampered by Scarcity of "Certificated" Seamen—Who is to Blame?

SHIP owners on the Great Lakes—and on both coasts, too, for that matter—are today so enmeshed in a snarled tangle of red tape and legal restrictions that some have begun to doubt their ability to cut their way through. The major constriction is the requirement of the La Follette law that 40 per cent of the deck crew must be certificated seamen.

An alarmist survey of the situation visualizes a plight of such serious import that this country's great manufacturing industries which look to lake vessels for their raw materials or for cheap freight rates, would find their activities seriously curtailed. And that this viewpoint cannot be ignored, one has only to read the deductions made by one of the Lakes' most prominent vessel men, presented on page 161, that this legal requirement means a shortage of 10,000 men.

From a Sane Point of View

The most careful analysis of the situation possible to make—an analysis that has its foundation on the best knowledge of ship owners, government officials, and close students of lake conditions—indicates that the present shortage of legalized A. B.'s on the Great Lakes is between 1,700 and 2,000. The maximum figure may even carry too strong a tinge of conservatism, but if that number of certificated seamen could be secured immediately, the situation would no longer be acute.

What are the primary elements of this situation?

The shipping plans of the iron and steel industry call for an iron ore movement of close to 55,000,000 tons, or about 6,000,000 more than ever handled previously. The coal movement will reach 33,000,000 tons. The grain movement will amount to 14,000,000 tons, or 480,000,000 bushels. The lumber trade is prosperous. Railroad freight congestion insures good business for the package freighters. Prosperous times like the present spell increased travel on the passenger boats. Many lake vessels have been sold during the past few months to seaboard interests and will go to salt water at the earliest date possible.

The conjunction of all of these elements was foreseen some months ahead. The steps taken were characteristic and under normal conditions, decisive. Where a year ago found but one bulk freighter on the stocks, every Great Lakes building berth for 1916 delivery is taken and some contracts have been let for 1917. The unprecedented number of boat sales and fleet consolidations occurring during the winter were the outward indications of the efforts being made to prepare for a record-smashing season. Some boats that have been laid up for several seasons will ply the lakes this summer again.

The Drift Log in the Propeller

Now for the fly in the ointment—or one might say, the driftwood in the propeller.

The numerous and varied provisions of the seamen's act with which the owners could comply unaided, have been met. The attitude assumed last autumn by the Lake Carriers' Association and by the various vessel interests assured a prompt compliance with the law's provisions. But against one provision —that requiring two-fifths of the deck crew to be certificated, it was beyond the power of the vessel owner to safeguard himself.

The sailors themselves bore the responsibility of securing certificates. The failure of a sufficient number to take this responsibility seriously has precipitated the present situation. For "slaves who are shedding their shackles" (according to the author of the seamen's bill), they act altogether unlike the popular impression of a newly-freed bondsman.

Washington is Responsible

And yet should we place the responsibility on the sailors? Can any seaman who has sailed the lakes with entire satisfaction to his master and himself, be blamed for his failure to break his neck to secure a certificate? All it means to him is that he can continue doing the same work he has always done. Why undergo the trouble of an examination to determine his fitness for duties he fulfilled satisfactorily in the past?

The backward trail of responsibility leads beyond the vessel owner, and beyond the sailor. Who can doubt that it leads direct to Washington, D. C.?

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Few "Certificated" A.Bs. on Lakes

Opening of Navigation on Great Lakes Finds Trade Disturbed by shortage of Certificate-Carrying Able Seamen

THE breaking up of the ice on the Great Lakes this spring opens a navigation season that promises to attract the greatest tonnage of freight ever transported on these inland commercial arteries. The demands of the blast furnaces scattered around the lower lakes can be satisfied only with a movement of from 53,000,000 to 55,000,000 tons of iron ore from the Lake Superior ranges. The fuel demands of the north will require a coal movement from Lakes Erie and Michigan of 33,000,000 tons. Grain shipments from the head of the lakes will supply an additional 14,000,000 tons or about 480,000,000 bushels.

Record Freight Movement Probable

The prospective freight movement is so heavy that the full capacity of the entire lake marine will be needed from late April to early December. The iron ore shipments are expected to exceed the previous high record made in 1913, by about 5,000,000 tons or 10 per cent. The coal movement will match the heavy shipments of 1913 and is expected to be 30 per cent greater than the average of the last five years. The grain shipments are expected to surpass any previous record by 20 per cent.

Few Americans Get Certificates

The foreign trade department of the San Francisco chamber of commerce recently procured from the United States local inspectors at the principal ports an official statement of the number of seamen who had received certificates since the seamen's law became effective. In a statement issued by the chamber as a preface to the table showing the results achieved under the law, it is asserted that "these figures show how much the 'American' seamen is benefitted."

Ports—	Total number passed.	Native born Americans.	Per cent.
Puget Sound	891	9	1
Portland	226	11	5
San Francisco	2,064	168	8
Galveston	288	29	10
New Orleans	293	15	5
Baltimore	752	543	72
New York	3,163	455	14
Boston	742	185	25
Philadelphia	699	161	23
Total	9,118	1,576	17

Ports—	Naturalized Americans.	Per cent.	Aliens.	Per cent.
Puget Sound	18	2	864	97
Portland	44	19	171	76
San Francisco	345	17	1,551	75
Galveston	20	7	239	83
New Orleans	10	3	268	92
Baltimore	17	2	192	26
New York	199	6	2,509	80
Boston	89	12	468	63
Philadelphia	25	4	513	73

The ships carrying other classes of freight also will be called upon to move record-breaking tonnages. The lumber industry will keep the lumber-carrying fleets running to capacity. The package freighters will benefit not only from the larger tonnages that the present business expansion would produce, but will receive an even greater bulk due to freight congestions on the rail carriers. The passenger interests in view of improved business conditions, expect and are preparing for an unusually heavy season.

Results of Federal Restriction

The vessel owning interests of the Great Lakes have repeatedly demonstrated their ability to meet unprecedented traffic demands. The shippers have learned to rely upon this latent capacity and under normal conditions would feel assured of the fleet handling all the freight proffered.

Proof that normal conditions do not prevail, is found in the belief, freely expressed by some vessel owners and shippers, that the full fleet will not be in service all the time, and more particularly during the opening weeks of the season. If this belief is supported by developments, the freight carrying capacity of the fleet will be

Legislative Restrictions Interfere With Opening of Lake Season

UNCLE SAM consumed a week or ten days in properly greasing the ways for launching his Villa-hunting punitive expedition into Mexico, 4,000 strong. The chiefs of this country's marvelously capable Great Lakes fleet require only three times as long a period to assemble an army of workers eight times greater. The muster of the crew is, moreover, only a part of the work represented in bringing the fleet from a state of almost complete inactivity in late March to a condition of fullest activity three or four weeks later. The ships must be freed from all marks of their winter lay-up, every part of the vessel must be inspected, overhauled and repaired or replaced, if necessary. Stores must be provided, and attention given to all of the innumerable details of fitting-out.

When the ice "goes out" on the lakes, the value of this policy of "preparedness" is evident. The iron ores of the northern ranges are brought down to rebuild the disappearing stockpiles at Illinois, Ohio and Pennsylvania furnaces. The coals of the latter states go on a similar mission to the railroads and industries of the north. Grain leaves its ice-locked refuges to satisfy the hunger of Europe. The winter's cut of timber moves to the mills.

To the men most intimately associated with this annual revivification of the fleet, the work is rather commonplace. Their unvarying success, year after year, in bringing the lake marine to its full capacity within the span of a few weeks, has obscured the importance of the achievement. The fleet has always been ready for business when the ice broke up.

But this year conditions are different. Some doubt has arisen as to the ability of the vesselmen to have their fleets fully prepared when the navigation season opens. In view of the signally large freight movement expected this year, this uncertainty is disquieting.

Backed up by records of past years, no doubt can be felt of the ability of the lake vessel managers to meet any tonnage problems the season may develop.

What, then, is the disturbing factor?

Governmental interference with business, through legislative restriction, furnishes the answer.

The accompanying article deals particularly with the provision of the La Follette law concerning "certificated" seamen. This clause has brought about an unusual situation in connection with the manning of the fleet. This condition is discussed and analyzed.

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reduced with resultant losses to both the vessel owner and the shipper.

A constriction of lake trade, if it materializes along the lines feared, will result from governmental interference through legislative restrictions. Of these, the clause in the seamen's law requiring that 40 per cent of the deck crew must be "certificated" has aroused the most concern. It is stipulated that the sailor before obtaining a certificate must have served at least 18 months on deck, and must pass a physical and mental examination.

With the opening of the season only a few days away, it is impossible to obtain correct figures as to the actual shortage of such "certificated" men. The best informed students of lake marine conditions are convinced that there will be a shortage and that some boats will be delayed due to their inability to meet this governmental restriction. The exact extent of the shortage is indeterminate and probably will be until the rush to place boats in commission really begins.

Shortage Estimates Vary

Available estimates differ but it is practically certain at present that the number of "certificated" men falls short of meeting the needs of the lake fleet by from 1,700 to 2,000 men. It must be remembered that at the time this story is written, the opening of the season is still several weeks ahead, and that the number of sailors applying for certificates shows an encouraging increase during the opening weeks of April. The rush of applicants, however, is not as heavy as the necessities of the situation demand. When navigation actually opens, the shortage will doubtless be well below the estimate of from 1,700 to 2,000 men, but there is no reason to doubt that a shortage will exist.

Estimates as to the shortage range from 1,500 to 9,000 men. One vessel manager of years' experience asserts that the shortage of these "certificated" A. Bs. will reach 9,000, but the overwhelming opinion in lake circles favors the estimate of less than 2,000 men. This manager reaches his conclusion by estimating the number of "certificated" men required on all boats of the American merchant marine to be 50,000. With the number actually certified only reaching 32,000, the apparent shortage is 18,000. Since one-half of the American-owned boats ply the Great Lakes, the shortage, according to this manager, is one-half of the total or 9,000.

The general assumption, however, is that the total number of men required aboard ships on the Great Lakes is 30,000. Of these about 10,000 are required for deck duty, so the restrictive requirement that 40 per cent of the deck crew be "certificated" demands that 4,000 receive certificates. The number of such certificates actually issued is about 2,500 so that 1,500 more must apply and pass the examinations before the full fleet can go into service. Supporting this assumption, it is known that there are about 1,400 vessels of more than 100 tons on the Great Lakes which come under the provisions of the seamen's law. On the basis of three "certificated" men to each boat, the total requirements are 4,200. Deducting the 2,500 who have already received certificates the shortage would be 1,700 men.

The first instance in which this restriction has delayed a ship going into commission, occurred a few days ago at Detroit when WAUKETA of the White Star Line was forced to postpone her initial trip through inability to secure the required percentage of certificate-carrying sailors.

To Give Act Fair Trial

The vessel-owning interests of the Great Lakes have already shown their intention to comply with the provisions of the law, which they had opposed prior to its enactment. They rescued the government from serious embarrassment last fall when the law became effective by voluntarily furnishing the help to the inspectors, which the government should have provided. Due largely to the efforts of these interests on whom the law places its heaviest burdens, a large number of certificates were issued at that time. Their efforts to give the act a fair trial elicited approval from Secretary of Commerce Redfield, in whose hands rests the enforcement of the law.

The department of commerce ruled last fall that when inspectors were convinced of the sincerity of the master's efforts to comply with the act, he could be permitted to sail without the required 40 per cent. This ruling was rendered necessary by the non-existence of anything like the number of "certificated" men re-

Section of Seamen's Law Which May Disturb Lake Trade

Sec. 13.—That no vessel of 100 gross tons and upward, except those navigating rivers exclusively and the smaller inland lakes and except as provided in section 1 of this Act, shall be permitted to depart from any port of the United States unless she has on board a crew not less than . . . . 40 per centum of which in the first year, 45 per centum in the second year, 50 per centum in the third year, 55 per centum in the fourth year after the passage of this act, and thereafter 65 per centum of her deck crew, exclusive of licensed officers and apprentices, are of a rating not less than able seamen. Every person shall be rated an able seaman, and qualified for service as such on the seas, who is 19 years of age or upward, and has had at least three years' service on deck at sea or on the Great Lakes, on a vessel or vessels to which this section applies, including decked fishing vessels, naval vessels or coast guard vessels; and every person shall be rated an able seaman, and qualified to serve as such on the Great Lakes and on the smaller lakes, bays or sounds, who is 19 years of age or upward and has had at least 18 months' service on deck at sea or on the Great Lakes or on the smaller lakes, bays, or sounds, on a vessel or vessels to which this section applies, including decked fishing vessels, naval vessels, or coast guard vessels; and graduates of school ships approved by and conducted under rules prescribed by the Secretary of Commerce may be rated able seamen after 12 months' service at sea; Provided, That upon examination, under rules prescribed by the Department of Commerce as to eyesight, hearing and physical condition, such person or graduates are found to be competent; Provided further, That upon examination, under rules prescribed by the Department of Commerce as to eyesight, hearing, physical condition, and knowledge of the duties of seamanship a person found competent may be rated as able seaman after having served on deck 12 months at sea, or on the Great Lakes; but seamen examined and rated able seamen under this proviso shall not in any case compose more than one-fourth of the number of able seamen required by this section to be shipped or employed upon any vessel.

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quired by the fleet, due in large measure to the insufficient preparation made by government officials during the interval between the law's enactment and the time it became effective. This belated preparation was shown by the tardy rulings on many of the provisions and by the failure of the officials to furnish sufficient help to certificate the men in a short time.

A number of sailors applied for certificates during December but in January, February and early March few applications were received. During the last few weeks, the number examined has increased. Any considerable rush of applicants in the next few days, however, is certain again to find the governmental facilities for quick examinations woefully inadequate to meet the situation.

Edwin F. Sweet, assistant secretary of the department of commerce, has just concluded a swing around the lower lakes. The purposes of his visit were threefold. As he explained, Mr. Sweet desired to urge upon the vessel owners the advisability of employing more than the required 40 per cent in order that delays through the defection of a few members of the crew, would be avoided; he desired to interview lake interests and government officials in order to determine how the law was working in practice; and he hoped to stir up interest in the approaching opening of navigation and so attract more applicants for examination.

Sailors Shy at Examination

In talking with a representative of *The Marine Review,* Mr. Sweet outlined the situation on the lakes as he had found it, and also discussed the working of the seamen's law.

"I have found all lake interests evincing a commendable desire to aid in the enforcement of the law," said Mr. Sweet. "Just now, every effort is being made to get the sailors to apply for certificates and I believe that little delay will be experienced at the opening of the season in getting the boats away. All the inspectors report a large increase in the number of applicants during the past few days.

"Many sailors have been deterred from appearing for examination through apprehension over the physical examination. This fear is unjustified, as the low percentage of failures indicates. At Buffalo, of about 700 applicants, only 90 were refused certificates, or about 13 per cent. The department is disposed to inaugurate the enforcement of the law with as little friction as possible and I am inclined to believe that the physical examinations now are more lenient than they will be next year. The percentage of rejection is increased also by the number of those who apply a second, third and even fourth time. In case a man is rejected three times, it figures in the records as three rejections, thereby increasing the percentage of those refused. We have endeavored to make the tests consistent with the duties the men must perform and I am convinced the government inspectors generally have rejected only those whose physical condition incapacitated them for duty at sea.

Claims Act Benefits Sailors

"The examinations, also, have proved a direct benefit to many men. In one case that was brought to my attention, a man was rejected owing to the deplorable condition of his teeth, a condition that could not fail to have injurious effects on his health. At the inspector's suggestion, he fitted himself with a complete set of false teeth and not only passed the second time, but the change will prove of material benefit to him. Many applicants suffering from minor complaints have received medical treatment during the winter and received certificates when they applied again this spring.

"Some complaints have been made concerning certain tests, but in general, I believe the tests have been fair. The nature of the color blindness tests has occasioned some unfavorable comment and the department will consider the advantages of installing a system of test lights similar to that employed by the railroads.

"Another cause of delay in the number of applications received, is the requirements that only 40 per cent of the deck crew must carry certificates. Some sailors have shown a disposition to let the other fellow do it. Reports spread by rejected applicants also have tended to discourage some who would otherwise appear.

"Some delays developed at coast ports when the law became operative but the difficulty has been adjusted. I believe the lake situation will adjust itself quickly and satisfactorily."

As shown in one of the accompanying boxes, the required percentage of "certificated" men increases from 40 per cent the first year to a maximum of 65 per cent. The actual number of certificate-carrying men required on many of the boats will not be known until after the vessels are inspected and are ready to go into commission. This doubt arises from another provision of the law which restricts deck hands from working in the fireroom or coal passers working on deck. Until the government inspectors determine the number of coal passers required, the number of deck hands needed cannot be determined.

On the largest bulk freighters on the lakes, the maximum crew carried is 32. This includes porters and waiters, the average crew for the big boats being about 30. Last year when the big freighters carried six deckhands, the crew numbered 11. This would necessitate an average of at least four "certificated" men to a vessel. If the number of deckhands is reduced, the number may be lowered to three. The number varies, of course, with other boats, depending upon their size and the class of service in which they are engaged. Some of the passenger boats will be forced to carry from 20 to 25 "certificated" men, while some of the smaller freighters will require only one or two.

Charters Steamer

The Superior Steamship Co., which was recently incorporated with a capital of $50,000, has chartered the steamer ALADDIN, about 5,000 tons gross, for a 12-months period, and will place her in the service between New York and Archangel about the middle of May. Negotiations are practically completed for the charter of another vessel, which will be sent to Liverpool. The company expects to engage in the general transportation business, but so far has not been able to obtain the vessels it wants, with the exception of ALADDIN and two small schooners, secured on single trip charters.

A contract has been concluded between the Nanyo Boeki Kaisha (South Sea Commercial Co.) and the Japanese government for the operation of a line of steamers between Japan and the islands of the Caroline group. The contract provides for an annual subsidy to the South Sea Commercial Co. of 42,000 yen or $21,000. A monthly service will be maintained on the main line between Yokohama and Turks island, from which two subsidiary lines will be operated, one to the islands on the east, including Jaluit, Kusaie and Ponapi, and the other to those on the west, including Yap, Pelew and Angour.

W. R. Grace & Co. have definitely decided to enter the Oriental service out of Pacific coast ports, according to news advices from San Francisco. The liner PENNSYLVANIA, formerly owned by the Pacific Mail Co., has been obtained by the Grace interests and will be operated from San Francisco and ports in China and Japan.

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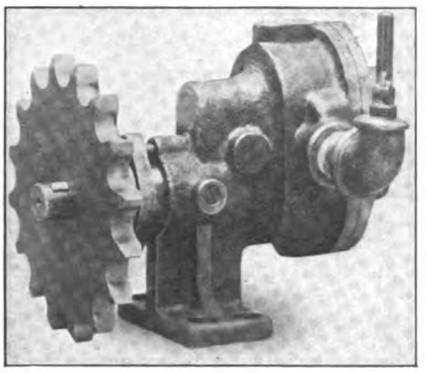
How the Submarine is Navigated

In the Absence of Lights and Buoys, Positions Must Be Reckoned by Propeller Revolutions—Instruments Developed for Submarine Navigation

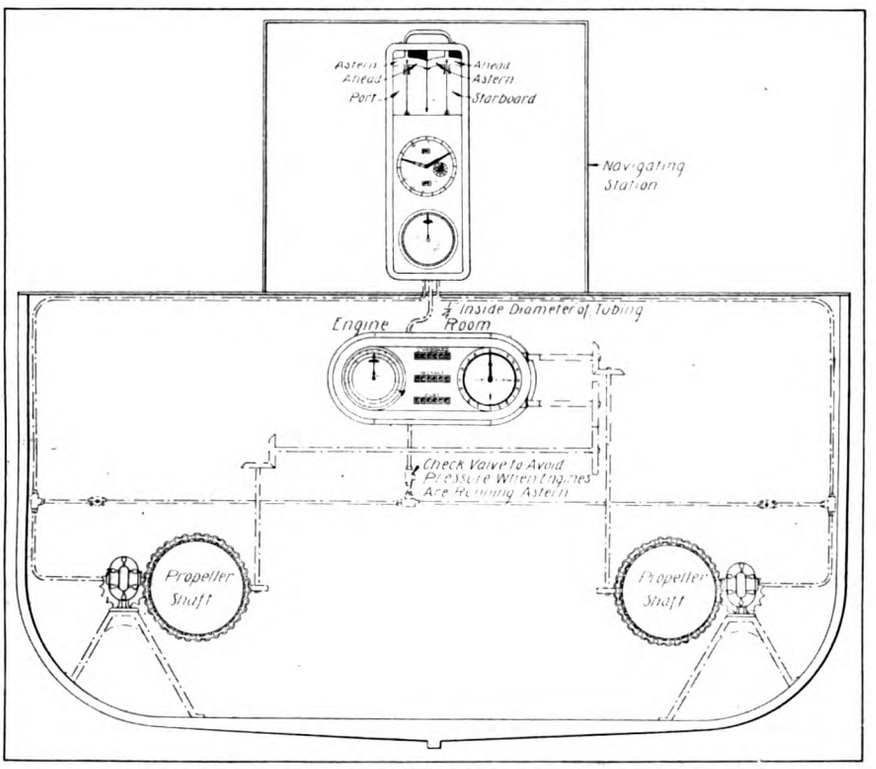
NO OTHER vessel is so dependent upon the revolutions of its propellers to determine distance traveled as the submarine. When running submerged, no buoys or land marks, taffrail logs or light ships are visible, and even the instinctive method of "sniffing the air" is of no service. The navigator must rely solely upon the propellers to determine position. While the submarine is being developed rapidly, each year finding its engines more powerful and reliable, the brains of its designers have been so busy with the main features that accessories have been lost sight of. The structural features have been strengthened and the radius of action increased, but navigating appliances have stood still until recently. Ships are being navigated today, with few exceptions, as they were 50 years ago, in spite of the progress of marine engineering. No naval commander, whose guns and other equipment were 20 years old, could go successfully into action against an adversary with modern equipment. Yet he is compelled to maneuver and determine his position by the methods used in the Civil War. Recently a set of navigation instruments, built by the Cummings Ship Instrument Works, Boston, has been placed on the market. These instruments, while relatively new, have been installed on more than 20 American naval vessels of all classes, from battleships to submarines. Dead reckoning by means of the Cummings Co.'s engine log system is based on the average revolutions of the propellers, whether one, two, three or four shafts are used. The system includes two small rotary pumps, one of which is driven from each shaft. These produce a vacuum in the pipe line when running ahead, and pressure when running astern. One revolution counter is fitted for each shaft and one for the average of the shafts, the former being operated through one-way gears. A one hand telltale and an automatic stop-clock are also located in the engine room. In the navigating station are the engine log and stop-clock and a revolution indicator for each shaft. The one-way gears are a combination of gears which will drive the counter shaft in one direction only, regardless of the direction of rotation of the main shaft. This device makes the counter show the total revolutions made both in ahead and astern directions. There is no troublesome reciprocating motion, the entire gearing being of the continuous rotary type.



VACUUM PUMP DRIVEN BY CHAIN ON PROPELLER SHAFT, WHICH ACTUATES THE REVOLUTION INDICATOR AND ENGINE LOG AND GOVERNS THE STOP-CLOCK

The averaging counter of the engine room instrument is driven by positive gearing from the starboard and port counter shafts, and is designed to show the algebraic average of the other two. The telltale hand is also driven by the starboard and port counter shafts. It remains stationary when both engines are running together, but if either engine runs faster than the other, it indicates by its direction of rotation which engine is ahead. The number on the dial indicates the gain in revolutions.

The stop-clock is designed on the principle of a stop-watch, but is much more rugged, there being two cycles in operation instead of the three in a stop-watch. Automatically starting from zero, the hand runs at the rate of one revolution per minute during a period of 100 revolutions. On high speed boats a period of 200 revolutions is employed. It is then tripped. The elapsed time since starting is, of course, the time required to make 100 or 200 revolutions, which corresponds to a fixed number of revolutions per minute. As the dial is graduated directly in revolutions per minute it shows the average revolutions per minute of both engines for the period elapsed. The hand remains



CROSS-SECTION OF SUBMARINE SHOWING GENERAL ARRANGEMENT OF INSTRUMENTS WITH REGARD TO THE SHAFTS AND NAVIGATING STATION

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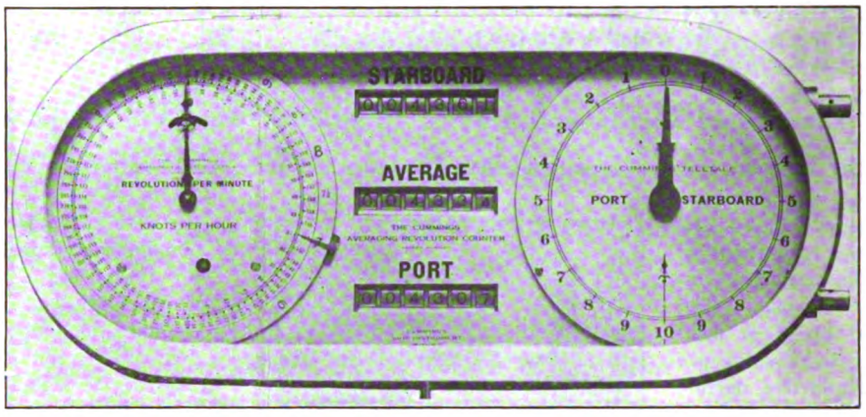
on the revolutions per minute for 75 revolutions; then automatically returns to zero for a fresh start. Thus the revolutions per minute are indicated accurately each 200 revolutions. The only error possible is in the time element of the clock. Even should the clock be extremely inaccurate as a timepiece, the error in time during 100 turns of the engine would, it is said, be altogether inappreciable. On the outer edge of the dial is marked, by the ship's force, her speed in knots. This varies, of course, for each ship. It enables the engineer to know the speed the ship is traveling, without moving a finger to obtain the information.



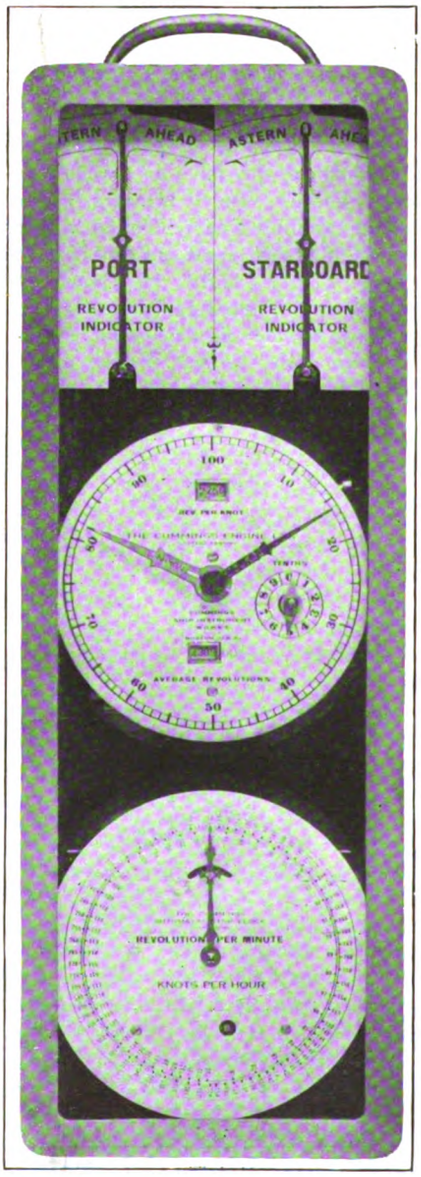
ENGINE ROOM INSTRUMENT WHICH SHOWS THE AVERAGE REVOLUTIONS PER MINUTE, THE SPEED OF THE SHIP, ALSO THE RATE AT WHICH ONE PROPELLER MAY BE GAINING ON THE OTHER

May Transfer Instrument

The instrument for the navigating station may be quickly transferred to the bridge when running afloat. In the center of this case, the engine log indicates the total distance traveled, the distance since the last setting and the total average revolutions of the engines. The navigator sets the small counter over "revolutions per knot" to the revolutions required to make one nautical mile. He thus establishes the correct ratio between propellers and hands. This may be changed as the speed increases or the bottom becomes foul, the navigator knowing at all times what settling to make under existing conditions.

The white hand indicates total distance traveled, and the black hand, the distance traveled since last setting. The "course" hand, used to determine the distance made on any course, may be set to zero upon passing any mark, without disturbing the white or "main" hand. The two small hands show tenths of miles, and, of course, make one revolution to each division covered by large hand. The small counter over "average revolutions" shows the total average revolutions made. The instruments are made to cover the wide range in revolutions per mile of a submarine, there being as much as 1,500 revolutions difference in some cases from slow speed afloat to high speed submerged.

The log is operated through a pipe connection to one indicator pump and controlled by a vacuum shut-off or century valve in the case with the engine room instruments. When the valve opens, a connection is made between the pump and log, causing a bellows in the log to contract, which in turn operates the hands and revolution counter in the log. After 50 revolutions, the valve shuts and admits air to the line, permitting the instruments to resume their normal position. The complete cycle of the valve is made each 100 average revolutions, except on boats making over 400 revolutions per minute, in which case 200 revolutions elapse between the successive openings of the shut-off or century valve.



PORTABLE INSTRUMENT FOR THE NAVIGATING OFFICER, FOR USE ON THE BRIDGE WHEN ABOVE WATER OR IN THE CONNING TOWER WHEN SUBMERGED

The stop-clock in this case is like the one in the engine room, except that it is tripped by the vacuum acting through the same pipe that controls the engine log, instead of being mechanically operated. The indicator contains a bellows which contracts under vacuum and expands under pressure. This contraction and expansion causes the hand to point to the position in which the shaft is running, being controlled by a pump operated by the shaft. The piping is so arranged that the log and clock may be operated from either pump, but this cross connection should never be left open, because one engine may be running astern and the other ahead, or one may be at rest. If this connection were open, the pressure or vacuum would be mutually released and indicators at the navigating station would fail to operate.

Steamship Man Dies

Joseph S. Raymond, 46 years old, vice president of the Clyde and Mallory steamship companies, died recently at his home in Essex Falls, N. J. Mr. Raymond was elected vice president of the company last November, following eight years of service as assistant general manager of the lines since their association. He was a member of the Railroad Accounting Association and had served one term as chairman of that body. He was also a member of the American Association of Freight Traffic Officers and of the Apawamis Club. For several years before moving to Essex Falls Mr. Raymond had lived in New York. He was a native of Nova Scotia.

Armour & Co. have bought the steam freighter IVANHOE, of 3,000 gross tons, for use between New York and foreign ports. She is now loading provisions for Liverpool and will take a full cargo. At present freight rates it is figured the boat will pay for herself in eight or ten trips.

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Recent Studies of Ship Resistance

Importance of Model Tank Trials is Emphasized—Fine Lines Forward With Considerable Flare, Also Cruiser Stern Advocated

By Ernest H. Rigg

THE subject of the determination of ship resistance naturally divides itself into two parts of primary importance, one concerning fine types of ships, and one concerning full types; where the line between the two should be drawn is by no means clearly defined, but, in practice, warships and passenger liners constitute the fine types and cargo steamers the full types, with, of course, some exceptions to be found both ways. Motor boats, submarines and hydroplanes are now the subjects of increasing investigation; the usefulness of the two latter types in the great war insures a measure of attention hitherto given only to the larger naval vessels. Published data are already assuming considerable dimensions; but there remains, however, plenty to occupy the staffs of the various experimental tanks the world over.

Need Uniform System

This article will deal more particularly with general naval and mercantile types. One of the first things that strikes the reader of the various authorities on this subject is the desirability of a uniform system of notation throughout the technical world. Anyone who can do something to bring this about will have earned the gratitude of all naval architects and naval engineers. When we read recent and valuable papers written abroad, we naturally find different systems of notation in use. There is, in practice, danger of serious error in using first one reference and then another, besides the labor of reduction of results from one system to the other, so that anything tending towards an international standard is well worth encouragement and advancement.

In recent years marked reductions in the power necessary to drive a given weight of ship and cargo at a given speed have been made; the experimental tanks are justly proud of the cuts they have been able to make in the power for models submitted to them for test. They are the people best placed to keep in touch with developments so far as smooth water results are concerned and are now producing tangible results for merchant ships of all types as well as for warships, both here and abroad. In 1912 the author read a paper before this society which pointed out several instances of saving due to experimentation; before and since then much has been written and something has been done to keep down coal bills. At the Franklin Institute, Philadelphia, in the same year, I ventured to suggest that the saving in coal made by the naval architect might well be handed back to him in part to provide extra subdivision and stability for passenger ships —by no means a bad reply to the question of extra first cost of additional beam and bulkheads—so that the passenger need never really know any material difference in the price of his ticket due to increased first cost of ship. The studies of twin-screw drives for full cargo ships, both steam and motor driven, have recently shown some unusually good results. Recent colliers built for the navy are cases in point, and their trials and service results are of particular value in all similar twin-screw vessel design, steam or motor. In recent years a strong tendency to conduct systematic experiments on ship resistance is noticeable, and for this we cannot be too grateful. Isolated pullings of models as submitted are necessary, but it is only when the lessons drawn from these experiments are followed by systematic research that the profession as a whole begins to derive benefit from the work done. We have passed from the stage of individual and disconnected experiments to that of systematic research directed along lines that are already having a marked effect in reducing power or increasing speed in shipping generally.

Progressive Trial Required

It should be remembered that model experiments are only half the battle; they must be followed by a progressive trial on the measured mile in order that the design of the propellers may be verified and the performance of the machinery properly noted. This trial should be conducted at the same trim and draught as the model was towed, and this should be as near the working load draught as possible and deep enough to give proper immersion to the screws. It will not always be easy for the builders to arrange for the loading of the ship, except in the case of oil tankers; but this can generally be managed at the expense of a few hours' delay to one voyage after the vessel is in service, once the owners realize the savings that are at stake.

At the time of the publication of Admiral D. W. Taylor's manual on marine propulsion, in 1910, the literature of this subject was beginning to assume good proportions. It was, however, scattered, and the naval architect who did not keep in touch with a good many sources of information was at a serious disadvantage. This book brought together the best collection and arrangement of experimental data that we have. The work of obtaining the residuary resistances for the wide range of speeds and coefficients is in itself a gigantic task and for which the profession all over the world is indebted in no small measure to the author and to the United States government, in whose tank it was so largely obtained. It can safely be said that this book marks an epoch in the methods in practical use for designing and powering ships. Ship builders and owners are now fully alive to the value of the tank and are keen to take advantage of all it can teach them, to their no small benefit in coal bills and better service.

Effect of Increased Beam

Mr. G. S. Baker's new work on ship propulsion, which has recently become available in this country, summarizes the present status of tank work and our knowledge of this whole subject in an able and clear manner. He uses, in the main, the "constant" system of notation, which is perhaps not as much used on this side of the Atlantic as on the other, and his book is a most valuable contribution to the literature on the subject, the main results of recent experimentation being carefully gathered together and presented in one volume. As in much other recently published matter, the full-cargo ship receives considerable attention in Mr. Baker's book. The chapter on canal towage contains information not generally available in such useful form.

It has long been known, and acted upon, that large beam, generally speaking, involved high resistance; we realize nowadays that too high a price can be paid for small beam and resistance. Increase of beam, accompanied by increase

From a paper read at the twenty-third annual meeting of the Society of Naval Architects and Marine Engineers, New York.

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of stability and decrease of fullness, by no means necessarily spells increase of power; for the same or less power a healthier type of vessel can generally be obtained, at, however, a somewhat increased first cost of hull material in most cases, due to increased wetted surface and wider decks. We have arrived at a point where increased safety is demanded in passenger carrying vessels; it is no use putting in bulkheads to enable a ship to keep afloat after damage if the danger of loss due to lack of stability in the damaged condition is not also provided for. Loss of buoyancy and loss of stability must both be kept in mind when settling on dimensions in a given case. The effect of this on speed and power will by no means be proportioned to the increased beam, as might appear at first sight.

Forward Waterlines

A far worse enemy to good driving is full waterlines in the forebody. In two recent cases of relatively fine and fast ships that have come directly under my notice, the forward waterlines were forced out by considerations of stability to the point of a marked decrease in speed when compared with similar ships of the same principal dimensions and power. This feature, also, has its limitations, for in full and slow cargo boats the exact opposite is true below a certain speed. While this is true for smooth water there remains the question of loss of speed in head sea. This question has readily received considerable attention. It is safe to say that passenger ships generally will show a tendency to increase beam in the future; extra life-saving equipment, the natural desire of passengers for deck cabins and extra stability for damaged condition all tending the same way. This will not necessarily entail more power, because we know more about good forms and because ships are tending to be somewhat finer to give better sea performances. The cruiser stern is another way out of this difficulty.

The British board of trade's recent instructions to steamers in the danger zone throw an interesting light on this point, applicable almost as much to peace as to war damage:

"In order to prevent the vessel taking a sudden list if holed by a torpedo, the stability should be increased to the utmost extent practicable by filling ballast tanks or otherwise."

Another paragraph relates to longitudinally bulkheaded ships of small initial stability; both these paragraphs point towards increased beam.

The same reasoning points to increased beam in our line of battleships. For a 31,500-ton ship, a beam of 110 feet is already responsibly suggested abroad. Who knows but that battleships laid down abroad since the war began are not of this largely increased beam? It is probable that less weight will be available for machinery, owing to increased protective weights; and that this, together with the new proportions, will mean a decrease in speed. The beam to draught ratio is about 3.25 in recent battleship designs, whereas in the 110-foot ship mentioned above it goes up to 4.40. The Yorktown experiments quoted by Admiral Taylor in his manual indicate an approximate increase in power of about 11 per cent for the same speed for battleships of this displacement and with proportions varying as above.

A good smooth-water performance is not necessarily a good sea performance; considerable attention has recently been given to this question and some interesting facts brought to light. Early this year Sir A. Denny cited instances of improvement in sea performances due to decrease in fullness compared with previously accepted practice. His point was that low first cost and low operating costs did not always go hand in hand. Mr. A. Hamilton in 1911 gave data based on the comparative performances of ships of varying fullness, all tending to show that the vessel of somewhat finer lines, particularly forward, more than balanced the loss in dead weight per trip by an increased number of trips per year.

It is difficult to deduce any rule, but the general lines to follow are obvious. The speed curves of the design should be run well up beyond the designed speed and attention given to the characteristics of the curves at the speeds beyond the smooth-water maximum as well as that maximum. It may often be that an apparent sacrifice at normal speed is no sacrifice at all, but really a decided gain in coal burned per annum in a seagoing ship, particularly a transoceanic or great coastwise trader.

Effect of Shoal Water

This subject has come to the front recently in practice as well as in theory. Torpedo-boat destroyers have furnished the most interesting cases, and the subject is worth very serious consideration by those responsible for the performance of vessels running in shoal bays, rivers and lakes. The literature on the subject gradually accumulates and we are now in possession of a very considerable amount. It is not too much to say that knowledge of the effects, both bad and good, of shoal water is absolutely necessary to the proper running of destroyer trials, and no less so for the designing of shoal-water vessels. It will pay those charged with running big vessel trials to be very careful where they run them.

On a recent trial of a 400-foot vessel drawing 19 feet and of 15 knots' speed, the performance at sea in smooth water was materially better than on the measured course, due to deeper water as well as to the absence of the necessity for frequently turning to run over the course; the reduction in horsepower being about 4 per cent. In a destroyer trial at 24 knots it was found that in 15 fathoms the power required to maintain standard revolutions was materially higher than on standardization and that on going off into deep water this at once changed.

Cruiser Sterns

Of late years an increasing number of merchant vessels have been built with the form of stern considered peculiar to battleships and cruisers.

There is much to be said in their favor and the effect on speed may well be noted here; for a given overall length this stern gives the maximum mean immersed length and a resulting decrease in power and consequently machinery weight, necessary for a given speed, varying with the size of the ship, being greater in the smaller ship. The adoption of this stern is attended with increase in stability, in deck room and in protection to screws in harbor. The chief objection is increased first cost, appearance is another in some eyes, but small increased first cost will have a hard struggle against a possible 8 per cent saving in coal bills. The arguments are very much in favor of the crusier stern for all twin or more screw designs, with a good chance in the single-screw design providing the draught is large. Modified cruiser sterns are common in our waters, for ships that do a large amount of warping into and out of docks, notably in the Chesapeake bay and similar waters; also on the coast in a few cases, some Old Dominion liners being built that way. Doubtless many other instances could be found.

It has been known for some time in the experimental tanks that temperature plays a part in ship resistance. Messrs. Denny Brothers, Dumbarton, Scotland, are reported to have been unable to account for differences in summer and winter trials of sister ships in any other way, and the matter is also under investigation at the Teddington tank in England.

Differences in resistance as high as 4 per cent per 10 degrees difference in temperature are reported, the lesser resistance corresponding to the higher temperature.

Lately appendage resistance has received renewed attention; since Taylor's experiments in the Washington tank, showing the run of the stream lines on ship models, designers have studied more carefully the placing of bilge and

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docking keels. Sadler's experiments on enclosed shaft bossings have also given valuable aid in properly placing these appendages. The author recalls a large vessel which had her bossing altered to better form with the result that the speed at constant displacement went up from 18 to 18½ knots. This increase in a vessel displacing over 11,000 tons was due solely to a change in the lines of the bossing. In battleships, appendage resistances as high as 25 per cent of the total have been recorded. The importance of reducing this where practicable is at once evident. No important vessel should be laid down without stream line diagrams at critical speeds. The fitting of anti-rolling tanks has a small and indirect effect on resistance. The result of omitting bilge keels is a saving of about 3 per cent, which is cut in half by the extra displacement due to weight of the tanks and contained water; this saving should help to pay for the tanks and controlling gear. Anti-rolling tanks, however, undoubtedly require skilled handling and constant watching whilst at sea. The importance of an allowance for air resistance should not be overlooked.

Comparing "Lines"

The system of notation used by Taylor and Sadler in presenting their results is ample, clear and direct; it is, therefore, preferable for general use. The model of practically every naval or passenger design should be tested in the tank and enough models of cargo vessels similarly tested to cover a useful range of vessels, so that each yard can know whether its "lines" are good and make improvements from time to time as experience points out. This is the only real way "lines" can be compared and improved, for trial conditions vary all the time and service conditions and results are seldom accessible to builders except in a very general way. In this connection the relative smooth and rough water performances should be kept in mind. For large cargo ships and practically all motor ships, a twin-screw drive is the most efficient; the two, three or four-screw drive is so well established in passenger and war ships as to need no further comment. Further light is desirable on vibration problems, especially for vessels with machinery aft. Speed and stability are intimately associated and generally pull at cross purposes; the temptation to small beam, high speed and comfort at sea for passengers may be yielded to at the price of safety in accident. We are at present witnessing the passing of the very full cargo ship at sea in favor of a somewhat finer type. This is a good step. Cruiser sterns for twin or triple screw ships are decidedly to be preferred to the old type of counter. Appendage resistance is generally very small in single-screw merchant ships, but cannot be watched too carefully in other and faster types. Enclosed shaft bossings are generally preferable to open brackets. We are not yet ready to advocate the general adoption of anti-rolling tanks. Progressive trials of important ships should always be made and enough cargo ships thus tried in load condition to check up model tank and propeller performances. This could well be emphasized towards oil tankers, on account of the ease with which they can be loaded; other types of ships of similar lines would thus also benefit. Flared bows above water are at present well established and undoubtedly improve performances at sea. Large apertures, propellers well back from the post, and ability to unship propeller without withdrawing the tail shaft, are other factors which deserve to be strongly recommended.

Competitive bidding tends to a cheaper first cost at the expense of subsequent performance, which leads to full models and poor time-keepers. In conclusion I should like to point to the plea for adequate trials, made by Sir A. Denny in his presidential address before the Institute of Marine Engineers at its fall meeting a few months ago.

Crosses Ocean 1,100 Times

By David Lindsay

A MOST remarkable sea-record, 63 years of continuous service practically in one organization, is that of Thomas Kinsey, the acknowledged dean of transatlantic pursers, who on his recent trip to Liverpool on the American liner ST. PAUL, completed, in addition to many voyages in other waters, his eleven hundredth crossing of the western ocean.

It has been estimated, and conservatively, too, that Mr. Kinsey has traveled more than 4,000,000 sea-miles, and it adds another strong argument for the safety of ocean travel to be able to say that at no time has he been exposed to serious danger, although the whole gamut of experience in storm and sunshine has been his, and he has witnessed several rescues. He started upon his career aboard the steamship CITY OF MANCHESTER in 1853, sailing between Philadelphia and Liverpool, when Messrs. Richardson & Co. were the owners and William Inman the manager of a small fleet of passenger vessels which in the course of years became the well-known Inman Line, later absorbed by the American Line. After "trooping" to India during the mutiny of 1857 and to Abyssinia throughout the long war in that section, Mr. Kinsey returned in 1867 to the trade between New York and Liverpool. He has continued since that time in the employ of the companies named, between America and England.

On his arrival in England a few days ago Mr. Kinsey, still hale and hearty, retired to his home and family at Southampton, followed by the good wishes of hundreds of thousands of travelers the world over who have journeyed under his care and who will recall with distinct pleasure his cordiality, his hearty handshake and his unfailing courtesy. His exceptional record, shipping men say, should be an ever-present inspiration to those "who go down to the sea in ships."

Late Marine Patents

Copies of any one of the following patents can be obtained by sending 15 cents in stamps to Siggers & Siggers, patent lawyers, National Union building, Washington, D. C., by mentioning *The Marine Review:*

1,159,683—Safety-float for submarines. Henry E. Keller and Harry M. Siedschlag, U. S. navy.

1,159,745—Submarine with detachable conning tower for life-saving purposes. Virginio Cavallini, Spezia, Italy.

1,159,787—Internal combustion engine. Forrest Nelson, Boston, Bessie D. Nelson, Boston, administratrix of said Forrest Nelson, deceased.

1,159,824—Propeller. Elmer C. Blackwell, Salem, Mo.

1,159,899—Boat propelling mechanism. Charles H. Clower, Philadelphia.

1,159,937—Dredge. John Robert Hart and John Robert Davis, Tampa, Fla.

1,159,945—Swimming device. Joseph Jacobs, San Francisco.

1,159,946—Bilge water extractor. Samuel Stewart Jamison, Saltsburg, Pa.

1,159,985—Fuel connection for internal combustion engines. Piatt M. Orlopp, Indianapolis.

1,160,062—Reversible boat. Thomas Herbert Gaskin, Woodford, Essex, England.

1,161,184—Explosive engine. Oscar M. Bergstrom, Minneapolis, assignor to Universal Mfg. Co., Minneapolis.

1,161,335—Internal combustion engine. Nathaniel R. Potter, Rochester, N. Y.

1,161,420—Foldable boat chair. Beverly I. Snelling, Washington, D. C.

1,161,453—Propulsion of ships. Edward Court, Wakefield, England.

1,161,464—Internal combustion engine. Giovanni Enrico, Turin, Italy, assignor, by mesne assignments to F. I. A. T., Poughkeepsie, N. Y., a corporation of New York.

1,161,484—Submarine vessel. Cesare Laurenti, Turin, Italy, assignor to Societa Fiat-San Giorigio, Spezia, Italy.

1,161,636—Submarine bomb. Daniel B. Dunlop, Petersburg, Va.

1,160,122—Buoy for submarines. Walter H. Amberger, Philadelphia.

1,160,180—Apparatus for constructing drydocks. Duncan D. McBean, New York.

1,160,257—Water-cycle appliance. Edward Burns, Covington, La.

1,160,410—Detachable boat motor. Chester A. Hoefer, Freeport, Ill.

1,160,506—Ferry landing mechanism. Harry T. Goss, Rutherford, N. J., assignor to George H. Frothingham Co., New York.

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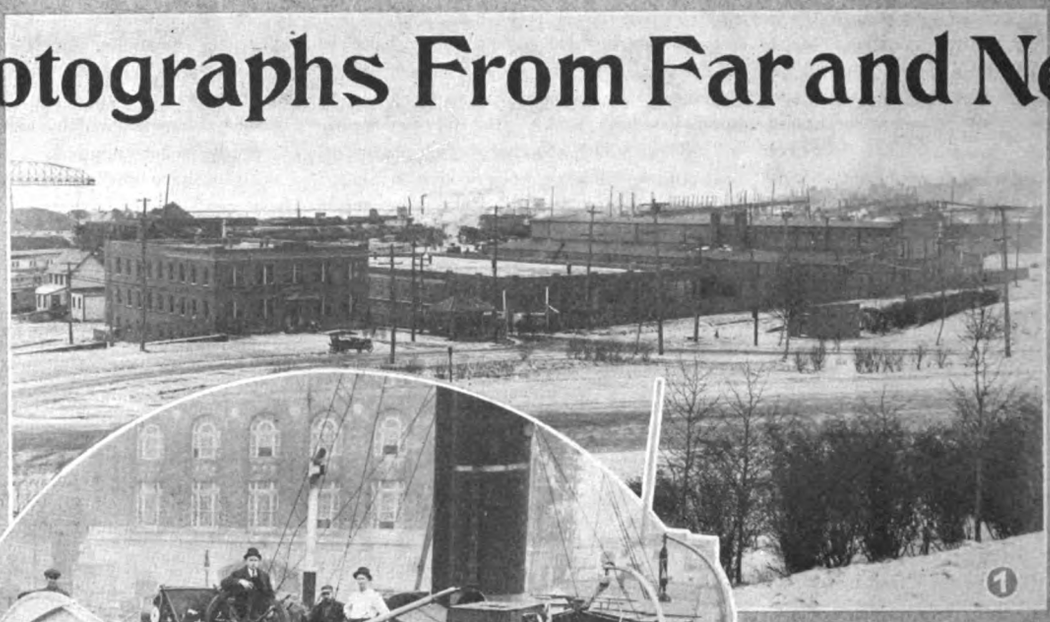
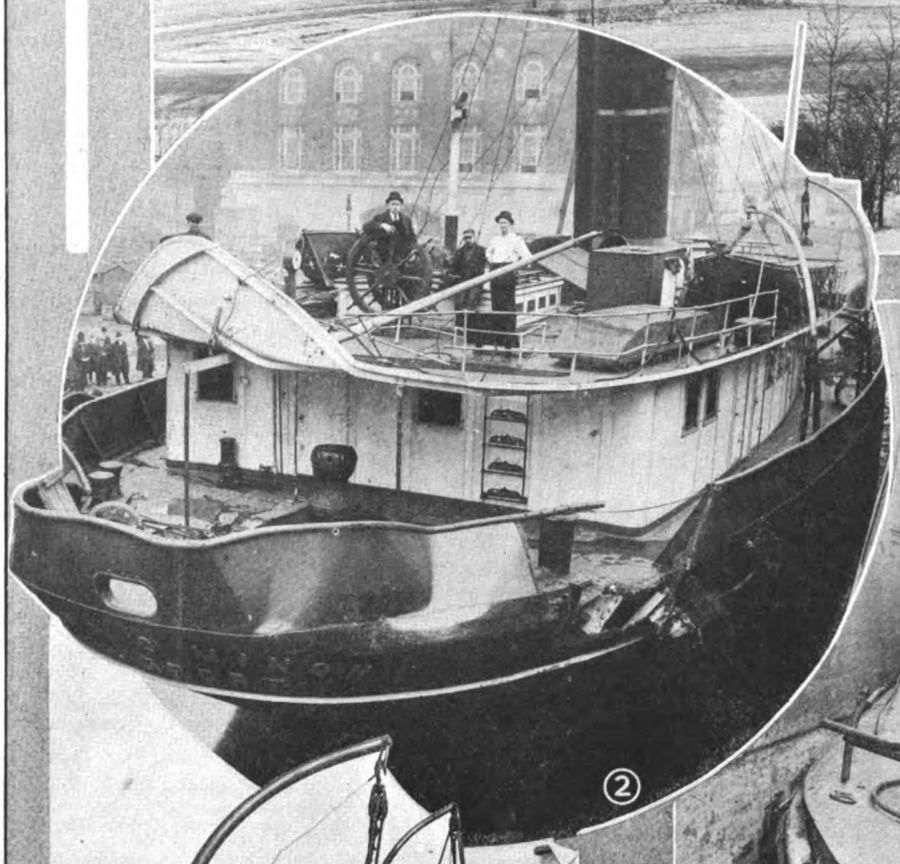
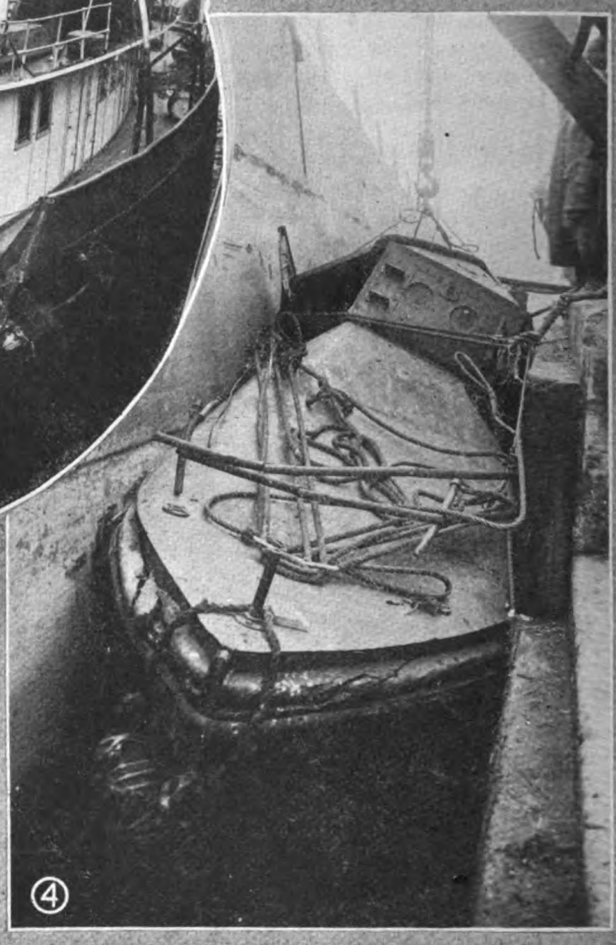
Photographs From Far and Near







EMERSON'S MOUSETRAP THEORY APPLIES TO GREAT LAKES SHIP BUILDERS

Perhaps the American Ship Building Co. couldn't build a better mousetrap than its neighbors; but although situated on the Lakes, it can and does build as fine ocean-going ships as any in the world. In order to cope with a host of orders, domestic and foreign, the capacity of its Cleveland plant was increased, as shown in illustration No. 1. In No. 2 is shown a big freighter in Buffalo harbor after a recent thaw caused the ice to break up suddenly. Illustration No. 3 depicts a lifeboat of the barge MAGNA, Pittsburgh Steamship Co., the crew of which set a record of 40 seconds time from the boat drill signal until the boat swung ready to lower. Illustration No. 4 shows a Buffalo tugboat crushed between a ship and a concrete dock.

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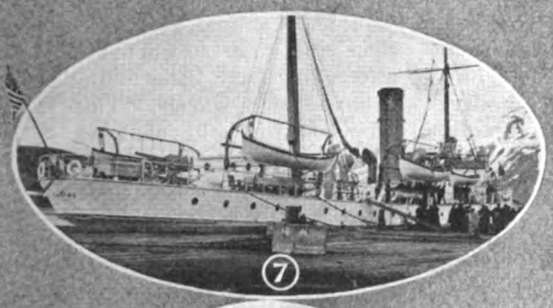
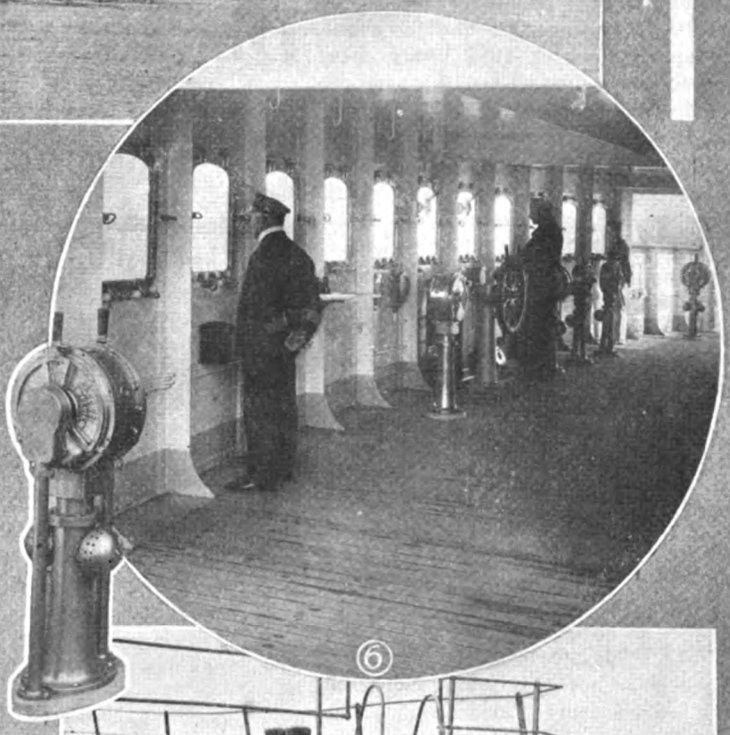
Latest Marine News in Pictures





A FACTOR THAT MUST NOT BE FORGOTTEN IN THE FINAL RECKONING

Prototype of the powerful merchant marine built up in little more than a generation, IMPERATOR awaits the inevitable cessation of hostilities. She is shown in illustration No. 5 and No. 6 shows her navigation staff on the bridge. The U. S. revenue cutter TAHOMA, which was wrecked on an uncharted Alaska reef, is seen at Unalaska, in No. 7. How soundings are taken by the U. S. coast survey ship EXPLORER in Bering sea is depicted in No. 8; while No. 9 shows ASSISTANT, a new steel pilot boat designed by Whittelsey & Whittelsey for use at New Orleans. Regardless of legislators, No. 10 would indicate that Great Lakes ore freighter crews are not overworked.

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Economy of Diesel Engines

MEMORANDA recorded in the minutes of hearings before the house committee on merchant marine and fisheries on the subject of government owned merchant marine discloses illuminating information on the economy of diesel engines for medium sized freighters. Comparative estimates were based upon the assumption that the typical cargo ship of the world at the present time would average a gross tonnage of 4,665, a net registered tonnage of 2,930 and deadweight cargo capacity of 7,880 tons. It would have a steaming radius of about 3,500 miles and should average approximately 10½ knots per hour. Such a vessel would require an indicated horsepower of 2,500.

In Pacific ocean service, a steam propelled ship of this type would require a crew of 44 officers and men, whose wages would amount to $26,520 per year. A vessel driven by diesel engines would reduce the number of men required and of course the amount of wages. On the other hand there is a question as to the economy in operation of a diesel engine due to higher initial cost, greater insurance rates, and possibly a greater cost for repairs. On this account, the advantage of a smaller crew will be ignored.

Cost of Fuel

In the cost of fuel, the diesel engine is claimed to be far more economical. The typical freighter, as previously assumed, if plying between San Francisco and Valparaiso, Chile, would make five round trips a year. Propelled by steam-driven machinery, 597 tons of coal would be consumed per trip; and if equipped with diesel engines 231 tons of oil would be used. At $6 per ton, for coal, and $7 for oil, the saving in favor of the diesel engine would be $1,965 per one-way voyage, or $19,650 for the year. Furthermore, the oil burning engine increases the dead-weight capacity of the vessel about 10 per cent. At the conservative rate of 5 per cent, the capacity of the typical freighter is increased from 7,880 to 8,280 tons. At $12 per ton, the normal rate prevailing before the war, the cargo value of the increased capacity amounts to $3,200 per one-way trip, or $32,000 per year. The total saving due to fuel economy and increased freight revenue would then be $51,650, a margin sufficiently large to make competition with Asiatic manned steam ships profitable for American crewed diesel propelled vessels.

In ships designed for both passenger and freight service the economy is slightly less. Comparisons must be based upon vessels requiring less than 5,000 horsepower as the diesel engine has not been adapted to the requirements of larger types. Assuming the ships are engaged in South American trade, making a round trip of 6,400 miles each month, the fuel charge for a coal burning power plant would be $9,280. A vessel equipped with diesel engine power would require 1,040 tons of oil per round trip, costing $9,100. The saving in favor of the diesel engine would then be $2,160 per year in fuel bills alone. The oil-burning vessel will have 500 tons more revenue carrying capacity than the steam driven ship. At $4 per ton, in each direction, this additional capacity will yield $4,000 per round trip, which aggregates $48,000 per year. The total advantage of the diesel type of power over steam therefore, amounts to $50,160, without considering a possible further advantage in decreased wages on account of there being no need for stokers in the oil burning vessel.

Discusses Lake Commerce

AN ESSAY entitled "The Great Lakes, Their Ships and Cargoes", recently prepared by R. Noble Wetherbee, Princeton university, contains a number of interesting historical facts and a large amount of economic data regarding present conditions in lake transportation. Portions of Mr. Wetherbee's paper are as follows:

"Before 1805 the lakes had very little traffic. Then, however, settlers began going into Ohio and trade commenced on a very small scale. American ships, for the most part, were still on Lake Ontario. After the peace of Ghent closing the war of 1812, the peaceful era of commercial growth began in earnest. In 1818 the first steamer was launched in Lake Erie, making trips from Buffalo to Detroit at the modest rate of $18 per passenger. The opening of the Erie canal in 1825 gave the incoming settlers a means of transportation from the east. Immigrants and their effects were reshipped on the larger lake vessels on which they were taken as far as Chicago. As yet Lake Superior was still shut off from the lower lakes because of the unnavigable rapids of the St. Mary's river. No astounding growth was to take place until this barrier had been removed.

"Soon after steamboats had reached Lake Superior the discovery and development of the rich deposits of iron ore at the head of the lake gave the stimulus which brought about a great growth. The necessity of getting this ore to the mills in Ohio, Pennsylvania, Illinois and Indiana has resulted in the creation of a class of colossal cargo carriers that for efficiency and results outdo any vessel known in maritime circles.

"Of the lake commerce as a whole the passenger business has contributed no inconsiderable share. Less than one hundred years have elapsed since the first steamer churned the waters of Lake Erie with its open unboxed side wheels. This type of propulsion is still used by a large number of passenger boats. But how different from the tiny 13-day "Walk-in-the-Water." The steamer CITY OF DETROIT III now makes the run between the same cities, Buffalo and Detroit, in less than 13 hours, carrying 2,000 passengers and 1,200 tons of freight at 25 miles an hour. A sister ship SEEANDBEE, is a trifle larger and is the largest sidewheel steamer in the world.

"But the real importance of the carrying feature of the lakes lies in the enormous bulk freight traffic besides a large amount of package or boxed freight. The magnitude of this business is almost unbelievable even to one who has seen the monster ships slip quietly down the river or lake and to one who has never witnessed the traffic at any state, the figures seem almost beyond imagination. For instance, in one year there were built 40 of these freighters with a combined trip capacity of 360,000 tons, which to carry by rail would require 300 trains of 30 cars each or a single train of 70 miles in length. This is but one year's addition to the entire fleet and in no way compares with the total traffic."

Freight rates from New Orleans to Bluefields and Cape Gracias a Dios, on the Atlantic coast of Nicaragua, have been increased, on an average, 40 per cent, as appears by a new freight tariff schedule issued by the Bluefields Fruit & Steamship Co.

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Trading Beyond the Arctic Circle

The Run to Archangel, on the White Sea, Presents Problems Encountered on No Other Commercial Route—A Sailor's Account of a Round Trip to That Port

By Captain George S. Laing

THE only commercial shipping route in the world that finds its way into the Arctic Circle is the traffic through the White sea off northern Russia. Whalers, explorers and a few straggling traders, both in the Pacific and Atlantic, enter the waters of the midnight sun, but their number are small. With the White sea trade, it is different. Here is a real, live and long established trade of large proportions, working under high pressure during the available season from June to October. The European war has greatly increased the importance of this route and in summer Archangel now ranks second only to New York in the number of ships arriving and clearing. Extra ice breaking tugs are now stationed at this port and it is hoped to break through and release the ice-bound fleet in a short time.

The Arctic circle, which encircles the globe at the latitude of 66 degrees 32 minutes north, runs through Siberia and Norway, acts as a northern fence to Iceland, and bisects Alaska. The highest latitude reached on the polar route to the White sea is 71 degrees at Nord Cap. A comparison of latitudes gives a vivid picture of how far removed this particular shipping route is from ordinary commercial channels.

Portland, Ore., is approximately 45 degrees north latitude, Portland, Me., 44 degrees and the mean latitude of the Great Lakes is 45 degrees. Even Belle Isle at 51 degrees is far to the south of the ports on the polar ladder to the White sea. In Norway, the latitude of Bergen is 60 degrees, Trondheim 63 degrees, Tromso 69 degrees, Hammerfest 70 degrees and the turning point at Nord Cap, more than 71 degrees. Even the great circles used by the Pacific steamers from Japan or the Atlantic steamers from Great Britain to the American shores, seldom carry a higher latitude than 53 degrees in their polar sweep.

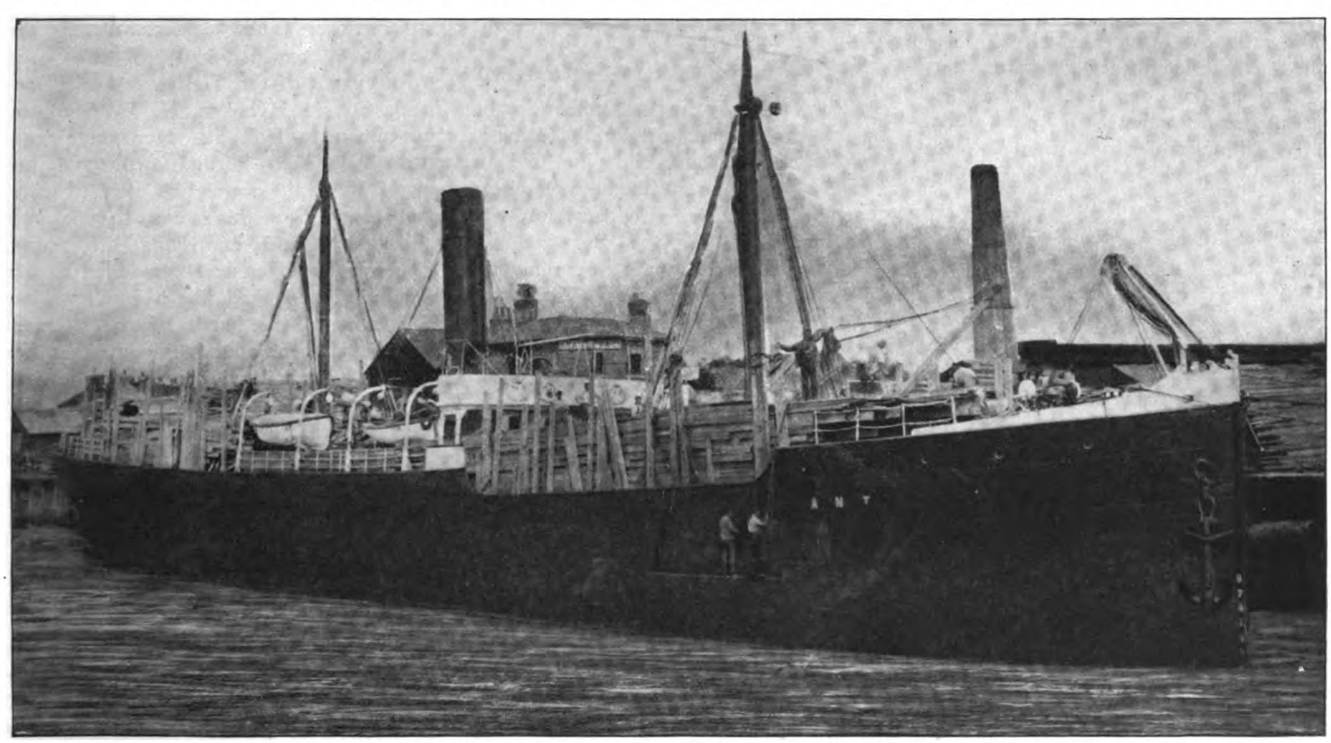
Principal Ports

An extension of the White sea trade actually runs into the Yenesei river in Asiatic Siberia. On this route, a still higher latitude of more than 73 degrees is reached. The main traffic. however, is confined to the White sea proper with Archangel and Kem the two chief ports. Kola, because of the war, is rapidly growing in importance.

Archangel in Russia and Kem in Finland are the outlets for immense consignments of lumber, flax, tar and tallow. The navigation season, ordinarily, is only four months and during that period, these ports handle an immense tonnage. Ship building is also carried on in Archangel, and a nautical college is located there.

The Wilson Line, of Hull, England, has run a passenger and package freight trade to these far northern ports for many years, but a huge fleet of ordinary tramp steamers and a few Russian fore and aft schooners and Norwegian barques also ply these Arctic waters. It is interesting to recall that the United States and Russia are the two countries which have always built and sailed the majority of the world's fore and aft rigged vessels.

Leaving a British or continental port, the run north is about 2,000 miles. The interesting and unusual part of the trip begins when one enters the Norwegian fiords near the South Lofoten islands. Sometimes, the ship is carrying coal and discharges at one of the many cosy harbors of the thousands of islands that act as a breakwater for the coast of Norway. The air is wonderfully pure and clear, while the scenery that spreads



STEAMER ANT DISCHARGING AT YARMOUTH FROM ARCHANGEL. THE HEAVY DECK LOAD IS TYPICAL OF THE WHITE SEA TRADE

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before the eyes of the traveler is enchanting in the extreme.

The little word cod has great significance in these islands, and a large number of the hardy youths, who are fishermen and sailors almost from birth, find their way into the American and British merchant service.

The inside passages through the islands and out into the open Arctic waters at Nord Cap, entail a 400-mile journey. If the winding course could be straightened, a hundred miles could be subtracted from this trip but any ship which has tried this plant has given it up. Steaming along the coast, dodging rocks and reefs, porting the helm four points here, and starboarding a few minutes later, would either make or mar young bridge officers.

Navigation Difficult

No finer training school for mates and masters can be found than the coastal work of these intricate fiords. Three years of White sea trading never brought a pilot on board of the two steamers on which I sailed. The water channels vary in width from an eighth of a mile to 5 miles in the most congested parts of the run, and chart work, in its most interesting form, is soon learned. Course running is done entirely by the physical features of the land as interpreted from the chart, with here and there a buoy or beacon. Time and distance are reckoned on approximate directions. It may be only an hour before midnight, but the sun hangs up in the sky at an angular height of from 8 to 10 degrees.

We are now around Nord Cap, have pulled to the southeast and are steaming down the Lapp coast. Here we meet large numbers of open boats under sail, bound from isolated places to the nearest port, perhaps Hammerfest, where their small cargo of furs or reindeer tongues can be bartered. A steam whaler may be sighted towing its prey to one of the boiling down stations. The inhospitable coast of Finland is hugged as closely as possible.

Ice and snow are in evidence although it is June. We pass Vardo where Nansen made a short stay on his road back to civilization. No places of any importance are found along this coast. You wonder at the boldness of the few lighthouse keepers who live in these bleak surroundings for a few months in the summer. Occasionally a herd of reindeer gazes inquisitively at you from the shore.

Sailing to the south, we soon enter the gulf of Onega and make fast to the dock at Kem.

This is a very important lumber shipping port. Work goes on night and day, or rather all day, as darkness is absent. Although Kem is south of the Arctic Circle, the sun barely dips below the horizon. The loading is done by men and women, many of whom are uneducated. Ordinary home comforts, as understood in the temperate zone are absent. Homespun cloth and furs are worn in summer as well as winter.

Now we are off to Archangel where we finish loading. This means leaving that port with from 12 to 15 feet of a deck cargo, as shown in the accompanying illustration and also with a heavy list. Some consolation may be gained in recalling that after putting in the summer with top-heavy lumber cargoes, we are generally chartered in the Spanish iron ore trade during winter. In the one case, our cargo is too high above the water line and in the other, it is too much below.

Steaming up the river to Archangel, we are compelled to accept the services of a Russian pilot. This port is vastly different from Kem and its docks are modernly equipped. The railroad south from this city feeds the shipping. Archangel is the most northern city of importance in the world. The barge trade on the great river Dwina also brings immense shipments of lumber, flax, tar and tallow to the summer fleet.

On the trip homeward, we may run through some of the larger fiords, to shorten distances and find smooth water, but we avoid the narrow and tortuous passages as our heavy list affects the handling of the boat. After passing south of the sixty-fifth parallel, the sun gives up its midnight vigil and lights have to be used again.

Secure Ships for Pacific

A new agency for a steamship line from Puget sound ports to Vladivostok, the H. F. Ostrander Shipping Co., has recently been established with headquarters in Seattle. Eight vessels have been chartered for the Puget Sound-Vladivostok trade. These range in dead weight tonnage from 5,500 to 8,000, and will be continued in the service as long as the trade justifies it. The ships now under charter will afford sailings once a week.

The United States Steamship Co. has entered into a contract for the purchase of all or at least 90 per cent of the stock of several steamship companies as follows: New York & Buffalo Steamship Co.; New York, Norfolk & Washington Steamship Co.; Hudson Navigation Steamship Co., and Palmer & Co., owning a completely equipped ship yard at Noank, Conn. The United States Steamship Co. was organized under the laws of Maine last December with an authorized capital of $25,000,000.

Buy "Junk" Steamer for $850,000

The steamship DUNHOLME, sold four years ago as a fire-blackened hulk for $30,000, has been bought for approximately $850,000 by the Standard Oil Co. She has sailed from New York for the east with oil in cases. This sale indicates the scarcity of bottoms and the lengths to which shippers will go to get vessels to move the freight of the world, since the war has so heavily burdened the merchant marine of both the Allies and neutral countries.

DUNHOLME, in November, 1912, was lying at a Bayonne, N. J., pier, near the Standard Oil Co.'s works, laden with case oil and ready for an ocean voyage, on which she would have left the next day. There was an explosion on board and flames spread over her. Soon she sank in her berth. Her British owners, the Pyman Steamship Co., of West Hartlepool, England, abandoned her to the underwriters, Lloyds, who sold her to the Merritt & Chapman Derrick & Wrecking Co. at auction for $30,000. The corporation raised her, took her to its long pier at Stapleton, S. I., and kept her there until last fall, when she was disposed of to the Clinchfield Navigation Co., of 29 Broadway. There had been frequent rumors about sales of DUNHOLME, and it was said that, as late as last July, she could have been "anybody's ship for $60,000." It was understood that the wrecking company netted a profit of $100,000 on her.

Resembled a Derelict

DUNHOLME's new owners, that is the Clinchfield company, had her towed over to the yards of the Tietjen & Lang Drydock Co., in Hoboken, N. J. She was not much to look at. Her superstructure had beeen burned away and her plates above the water line were wracked and bent. She was covered with soot and grime and her lying off Staten island in the open had not added to her beauty. She looked like a derelict when she came to the hands of the ship repairers. It was found, though, that her engines and boilers were not in as bad shape as had been supposed and that her hull was firm and sound. The surveyors who went over her said that it was a surprise to find how good her condition was.

The Clinchfield company states that they made a $300,000 contract for her to be put back in seaworthy condition. The work has now been completed and in April she steamed away from Hoboken, took on more of that case oil which was her original undoing and then started for the Orient under the American flag.

In eastern maritime circles it is gen-

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erally reported that the Standard Oil had paid $850,000 for the ship and at the offices of Moore & McCormack, agents for the Clinchfield enterprises, it was admitted that the sum mentioned was "about right." It could be stated, it was said, that the price was more than $800.000, anyway.

Those who know DUNHOLME declare that, in the existing conditions, the price is not unduly high. The vessel is of steel, 335 feet long, 47 feet in beam, and draws 24 feet 7 inches. Her gross tonnage is 3,313 and her net 2,133, while she is capable of carrying a dead weight of 5,500 tons. She has 300,000 cubic feet of cargo space, which makes her useful for carrying bulky merchandise. If she can carry 150,000 cases of oil to Alexandria, at a rate of $3 a case, it would not take long to get back her purchase price.

Advance Wages on Lakes

THE special committee, appointed by President Livingstone, to consider the wage scale to be paid on vessels enrolled in the Lake Carriers' Association, held several meetings during the past month and finally reported the schedule, working out at a general advance of 10 per cent, to the executive committee. The executive committee met on March 22 and adopted the schedule as a minimum scale without material change. It will be noted from the schedule printed above that the grades of wheelsmen and watchmen have been abolished and the grade of wheelsman-lookoutsman established in the place of the discarded classifications. Briefly stated, chief engineers and first assistant engineers on both class *A* and class *B* boats receive an advance of $15 per month, while second assistant engineers on both of these classes receive an advance of $16 per month. The first mate, second mate, boatswain and cook on class *A* and class *B* boats receive an advance of $10 per month, while the second cook receives an advance of $14 per month. Waiters receive an advance of $4 per month, porters $5 per month, oilers $5 per month, firemen and water tenders $7.50 per month, wheelsmen-lookoutsmen $5 per month and ordinary seamen $6 per month. The coal passer, a new grade, receives $35 monthly.

New Wage Schedule Adopted by Lake Carriers' Association

STEEL STEAMERS—FIRST CLASS

	Per Month
Class A*:—	
Chief engineers	$190.00
First assistant engineers	140.00
Second assistant engineers	100.00
Class B*:—	
Chief Engineers	170.00
First assistant engineers	125.00
Second assistant engineers	100.00
First mates	140.00
Second mates	100.00
Boatswains, to Oct. 1	70.00
Boatswain, Oct. 1 to close of nav.	75.00
Cooks, vessels over 4,000 gr. tons.	100.00
Second cooks, to Oct. 1	50.00
Second cooks, Oct. 1 to close of navigation	60.00
Waiters, to Oct. 1	40.00
Waiters, Oct. 1 to close of nav.	45.00
Porters, to Oct. 1	35.00
Porters, Oct. 1 to close of nav.	40.00
Oilers, to Oct. 1	60.00
Firemen and water tenders to Oct. 1	60.00
Firemen, oilers and water tenders, Oct. 1 to close of navigation	67.50
Wheelsmen-lookoutsmen, to Oct. 1	60.00
Wheelsmen-lookoutsmen, Oct. 1 to close of navigation	70.00
Ordinary seamen, to Oct. 1	37.50
Ordinary seamen, Oct. 1 to close of navigation	45.00
Coal passers, to Oct. 1	35.00
Coal passers, Oct. 1 to close of navigation	40.00

*Class A—Steel steamers of over 4,000 gross tons government register.

Class B—Steel bulk freight steamers of 2,100 to 4,000 gross tons government register, and steel package freight steamers over 3,000 gross tons, government register.

Boatswains shall be carried on all boats of over 4,500 gross tons, government register.

STEEL STEAMERS—SECOND CLASS

Chief engineers, bulk fr'ght steamers 500 to 2,100 tons	$155.00
Assistant engineers, bulk freight steamers 500 to 2,100 tons	110.00
Chief engineers, steel package freight steamers, 1,800 to 3,000 gross tons	170.00
First assistant engineers, steel package freight steamers, 1,800 to 3,000 gross tons	125.00
First mates	125.00
Second mates	85.00
Cooks, vessels less than 4,000 gr. tons	85.00
Second cooks, to Oct. 1	50.00
Second cooks, Oct. 1 to close of navigation	60.00
Waiters, to Oct. 1	40.00
Waiters, Oct. 1 to close of nav.	45.00
Porters, to Oct. 1	35.00
Porters, Oct. 1 to close of nav.	40.00
Oilers, to Oct. 1	60.00
Firemen and water tenders, to Oct. 1	60.00
Firemen, oilers and water tenders, Oct. 1 to close of navigation	67.50
Wheelsmen-lookoutsmen to Oct. 1	60.00
Wheelsmen-lookoutsmen, Oct. 1 to close of navigation	70.00
Ordinary seamen, to Oct. 1	37.50
Ordinary seamen, Oct. 1 to close of navigation	45.00
Coal passers, to Oct. 1	35.00
Coal passers, Oct. 1 to close of navigation	40.00

WOODEN STEAMERS—FIRST CLASS

Chief engineers, bulk fr'ght steamers over 1,200 tons. Package freight steamers over 750 tons.	$155.00
Assistant engineers, bulk freight steamers over 1,200 tons. Package freight steamers, over 750 tons	110.00
First mates	125.00
Second mates	85.00
Cooks	85.00
Second cooks, to Oct. 1	50.00
Second cooks, Oct. 1 to close of navigation	60.00
Waiters, to Oct. 1	40.00
Waiters, Oct. 1 to close of nav.	45.00
Porters, to Oct. 1	35.00
Porters, Oct. 1 to close of nav.	40.00
Oilers, to Oct. 1	60.00
Firemen and water tenders, to Oct. 1	60.00
Firemen, oilers and water tenders, Oct. 1 to close of navigation	67.50
Wheelsmen-lookoutsmen, to Oct. 1	60.00
Wheelsmen-lookoutsmen, Oct. 1 to close of navigation	70.00
Ordinary seamen, to Oct. 1	37.50
Ordinary seamen, Oct. 1 to close of navigation	45.00
Coal passers, to Oct. 1	35.00
Coal passers, Oct. 1 to close of navigation	40.00

BARGES

Mates on barges not less than ten dollars ($10) per month more than seamen on the same vessel; and donkey men five dollars ($5) per month more than seamen.

Mates' wages on tow barges of the larger class (vessels which paid their mates $73.00 a month last year) $80.00 per month for the entire season.

Able-bodied seamen on tow barges fifty-seven dollars and fifty cents ($57.50) per months until Oct. 1, and seventy ($70.00) dollars per month from Oct. 1 to the close of navigation.

The engineers on tow barges carrying towing machines $80.00 per month.

The cooks on tow barges the same wages as the seamen on the same barges.

Ordinary seamen on barges $35.00 per month to Oct. 1 and $45.00 per month from Oct. 1 to close of navigation.

GENERAL

Wages of seamen, firemen, oilers and water-tenders employed in fitting out, $1.50 per day when boarded on the vessel and $2.25 per day while they are not boarded on the vessel.

Sailing wages of seamen, firemen and oilers to be paid until the vessel is laid up. Vessel is considered laid up when steam is turned off.

Wheelsmen-Lookoutsmen are men who stand a three-hour trick at the wheel and three-hour watch on deck each watch.

Handymen, where carried, same wages as oilers.

THE OPEN SHOP PRINCIPLE

The following resolution was adopted unanimously by the Lake Carriers' Association, and as it admits of no deviation the officers of our ships, in all departments, must govern themselves accordingly:

The experience of the ship owners, managers and licensed officers for the past years has demonstrated the necessity of what is referred to as the open shop principle, in order to give that control and direction of the ships which is required for the equal good of the owner, the employe of the ships and the dependent trade. And so it is resolved:

1. That the owners of ships on the Great Lakes do now declare that the open shop principle be adopted and adhered to on our ships.
2. That the Lake Carriers' Association stands for the foregoing principle.
3. That the matter be referred to the executive committee with full power to act and carry out this principle.
4. That it should be the aim of the committee in the means they shall adopt, to recognize a fair and equitable rate of wages, to insist on such regulations as shall promote the comfort, and well-being of the employes, shall put the discipline of the ship in the hands of the executive officers and tendering liberal appropriate wages and conditions, requiring in response appropriate diligent and prompt service from the members of the crew.
5. And at this meeting, representing 91 per cent of the tonnage of the association, as a definite and specific support to the committee it is voted to adhere to and observe this action, referring also any and all special cases to the committee.

W. LIVINGSTONE, President.

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On the second class vessels the chief engineers of bulk freight steamers of from 500 to 2,100 tons, are advanced $15 per month, and assistant engineers on bulk freight steamers of from 500 to 2,100 tons, are advanced $10 per month.

Chief engineers on steel package freight steamers of from 1,800 to 3,000 gross tons are advanced $15 per month and assistant engineers on steel package freight steamers of from 1,800 to 3,000 gross tons are advanced $15 per month. First mates on second class boats are advanced $13 per month and second mates $7 per month. Cooks on vessels of less than 4,000 gross tons are advanced $7 per month, second cooks $14 per month, waiters $4 per month, porters $5 per month, oilers $5 per month, firemen and water tenders $7.50 per month, wheelsmen-lookoutsmen $5 per month and ordinary seamen $6 per month. The coal passers receive $35 per month.

On wooden steamers of the first class the chief engineer on bulk freight steamers over 1,200 tons and package freight steamers of 750 tons, receive an advance of $15 per month. Assistant engineers of the same classification receive an advance of $10 per month. First mates receive an advance of $13 per month, second mates $7 per month, cooks $7 per month, second cooks $14 per month, waiters $4 per month, porters $5 per month, oilers $5 per month, firemen and water tenders $7.50 per month, wheelsmen-lookoutsmen $5 per month and ordinary seamen $6 per month. The coal passers receive $35 per month. The complete schedule is shown in the accompanying table.

The action of the Lake Carriers' Association has been followed generally by other vessel owners.

Great Lakes Red Book

THE number of fleets on the Great Lakes showed a decline of approximately 15 per cent during the past winter. There are now 308 fleets operating on the Great Lakes compared with 360 at the opening of 1915. This surprising change is revealed in the new edition of *The Great Lakes Red Book*. The data for this edition have just been compiled by *The Marine Review*, the book being now ready for distribution.

The decrease in the number of fleets, however, will not interfere with the total carrying capacity, as the number of vessels on the Great Lakes remains practically unchanged. In preparation for the heavy freight movement expected during this year, a number of fleets have been consolidated, many of the larger interests adding to the number of vessels under their control. The value of vessels on the Great Lakes increased greatly during the past year and many smaller fleet owners decided to dispose of their holdings at advantageous figures.

The Great Lakes Red Book this year contains a practically complete list of more than 1,000 lake vessels, together with the names of the owners, captains and engineers of each individual boat. The convenient form of indexing employed in previous years has been preserved, thus facilitating the prompt location of the main particulars of any vessel. The capacities of all of the ore carriers on the Great Lakes are also shown.

The large number of sales made during the winter has caused the renaming of many boats. The following list, taken from the records of *The Great Lakes Red Book*, shows practically all of the changes in names made during the winter:

OLD NAME	NEW NAME
E. F. Holmes	Collins
Wisconsin	Harvey
Bransford	McLean
H. B. Hawgood	Mitchell
J. M. Jenks	Richardson
Umbria	Shiras
H. S. Holden	Argus
A. C. Dustin	J. A. Campbell
H. P. Bope	E. A. S. Clarke
M. A. Hanna	Hydrus
D. G. Kerr	Harry R. Jones
Ward Ames	C. H. McCullough Jr.
Clarke, E. A. S.	Mars
W. H. Gratdick	Pegasus
J. J. Albright	Regulus
Loftus Cuddy	C. S. Robinson
Walter Scranton	Saturn
W. E. Reis	Uranus
Pendennis White	Vega
Normania	Wm. F. Stifel
Wainwright	W. C. Richardson
Charles A. Luck (Nee City of Berlin)	Richland
Champlain	Frank Billings
Ontario	F. R. Hazard
St. Clair	E. L. Pierce
L. C. Smith	Sweden
Horace S. Wilkinson	Belgium
James Corrigan	Arthur E. Newbold
J. G. Munro	Effingham B. Morris
D. B. Meacham	Edwin E. Slick
Charles Weston	J. Leonard Replogle
Selph	Pathfinder
Alfred Clark	Saugatuck
Yale	Charlotte G. Breitung
John W. Moore	Edward N. Breitung
J. J. McWilliams	Central West
Geronia	Syracuse
E. D. Carter	W. T. Roberts
Oceanica	Columbus
L. C. Waldo	Riverton
Sowards	Rand

The Pittsburgh Steamship Co., which operates the largest fleet on the Great Lakes, now has 101 vessels under its control, compared with 93 at the opening of 1915. Of this number, 21 are barges. The Pittsburgh company purchased six steamers from the Acme Transit Co. and has three 12,000-ton carriers under construction. COLGATE was sold. The Interlake Steamship Co. has added 15 vessels to its fleet, mainly through the purchase of 13 vessels formerly owned by the Cleveland Steamship Co., John Mitchell, manager. The Cleveland-Cliffs Iron Co. increased its fleet from 13 to 23 vessels. Among other purchases, the Cleveland-Cliffs company bought three vessels from the Craig interests, Toledo, three from the Davidson Steamship Co., Bay City, and two from E. D. Carter, Erie, Pa. W. H. Becker, Cleveland, will operate 17 vessels this year against 13 in 1915.

The demand for salt water tonnage caused the purchase during the winter of more than 30 vessels. Many of these have already been delivered at coast ports, while others will be sent through the Welland canal at the earliest possible date. The following list shows practically all of the lake vessels which have been sold to coast interests:

Norwalk	St. Paul
Lackawanna	Algonquin
E. L. Fisher	Bennington
Newona	Burlington
Owego	Ogdensburg
Brownell	Rutland
McCullough	Averell
Binghamton	Haskell
Jesse Spalding	G. R. Crowe
E. L. Hines	Charles Beatty
Algonquin	Omega
Wm. Castle Rhodes	America
Huron	H. H. Brown
Minneapolis	Sch. Gettysburg

Bge. Alex. Anderson

Accepts Battleships

The superdreadnaughts RIVADAVIA and MORENO, built by the Fore River Ship Building Co. and the New York Ship Building Co., respectively, have been accepted by the Argentine government at the expiration of the guarantee period of one year specified in the contracts for their construction. It is estimated that during the past twelvemonth, in which the ships cruised more than 15,000 miles each, they were visited by more than 1,000,000 persons.

The contracts for these vessels were secured by the Fore River company against strong European competition, that for MORENO being sublet to the New York company. The turbines and other machinery were built in Quincy, Mass.

Senor Valiente, minister of marine of the Argentine Republic, expressed on behalf of the president of his country and himself his entire satisfaction with the building, delivery and performance of the warships. He described them as "a remarkable work of naval architecture honoring the American industry."

The Darrow, Mann Co., Boston, has closed contracts with the New York Shipbuilding Co., Camden, N. J., for two steamers, each 369 feet long, 8,500 tons capacity.

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What the Government is Doing

Rulings on Marine Matters **Improvements to Waterways**

Hints to Navigators

Ship Purchase Bill Strikes Many Snags

ATTEMPTS being made by supporters of the administration ship purchase bill to force the measure through congress are being watched with considerable interest, leaving the outcome in doubt. The full membership of the house committee on merchant marine and fisheries have come to a deadlock over the measure, and is unable to make any progress in its consideration. This has compelled the sponsors of the bill to resort to a new plan to expedite it. Accordingly, a subcommittee of the entire membership was selected, with the hope that the subcommittee could reach an agreement to order it reported favorably to the house. The full committee took up the measure for consideration shortly after the hearings were concluded on March 10, and after holding several meetings the committee found itself widely split, and at a standstill. With the Republican and Democratic members lined up against and for it, respectively, it was seen to be useless to hold more meetings. A point was reached where the committee could not muster a quorum.

No Agreement in Sight

While the subcommittee is expected to maintain a quorum at its meetings, there is no indication that an agreement upon the measure will be reached by the opposing sides. In this event, it is believed that the administration supporters, being in the majority, will take the situation in hand, and arbitrarily move the previous question, thereby getting a vote on the bill, the majority voting to order a favorable report on it, with the minority voting against this plan, and perhaps preparing to submit a separate report, condemning the measure.

Indicative of the lack of progress made during consideration of the measure, it is understood that the only provision in it which was agreed to by the opposing sides was that relating to the appointment of a shipping board to regulate rates and other matters concerning water transportation. Reports have it that there are some Democratic members who stood ready to make certain compromises in an effort to get a quick and favorable report on the bill, which, it had been hoped by its supporters, would reach the floor of the house by the end of March. One faction of the Democratic membership, it is claimed, was willing to set a limit to the period of years providing for government ownership and operation of vessels. It is believe some of the Republicans would have consented to let the bill be reported out if the compromise mentioned above were determined upon, while other Republicans expressed their determination to oppose any plan which would call for government ownership or operation of steamships. There is a strong sentiment among the Republicans favoring subventions for the upbuilding of an American merchant marine, but the Democrats are said to have unanimously opposed this plan.

Mr. Alexander said that virtually all of the general principles of the bill had been discussed by the whole committee. This is believed to denote that, after the measure had been given close attention, the committee found itself hopelessly deadlocked, driving its supporters to the alternative of selecting a subcommittee to take up further consideration of the bill. It is said that but few amendments have been offered.

Majority Members Worried

No particular anxiety regarding the bill had been displayed by its supporters up to the time previous to the passage of the army bill in the house, because the administration program, as laid out by President Wilson, gave this and other national defense measures the right of way over all other legislation. But when the army bill was passed by the lower body, and with the naval bill being prepared for reporting, the shipping bill was seen to be lagging behind. Then its supporters became apprehensive lest congress adjourn without its even being brought to a vote in the house, much less being brought before the senate, provided it passes the lower body.

The administration has been spurring the majority members of committee to hurry and whip the bill into shape and take it to the floor of the house, this measure having been included in the "boiled down" program for enactment at the present session of congress. Replies made to the White House as to the shipping bill situation were disconcerting. Even provisions governing the shipping board plan were not fully concurred in, Republican members of the committee objecting to the provision permitting the board to do a regular ship brokerage business. The full committee, however, finally voted to increase the proposed membership from three to five, but some of the Republican members protested strongly against the plan to have two members of the cabinet, the secretary of the navy and the secretary of the treasury as members of the board.

Cabinet Members Are Busy

Secretary of Commerce William C. Redfield and Secretary of the Treasury William G. McAdoo have continued their efforts to arouse sentiment in favor of the bill. Mr. McAdoo, alive to his opportunities, has campaigned for the measure in the speeches made on his South American tour. It apparently is his design to create such sentiment in the southern republics as to influence the United States congress to support the measure, under the belief that it would mean the establishment of ship lines between this country and South America that would result in building up a big trade for the United States.

Nothing has developed to change the opinion existing among many that the bill might be defeated in the house. There appears to continue the

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possibility, if not probability, of a defection among Democratic representatives that, combined with Republican opposition, would vote the measure down. While a number of Republican senators think the measure would be passed by the upper body, if it reached the senate, it probably would be subjected to a bitter and prolonged attack, although it seems unlikely that it would be the object of a filibuster. The political-parliamentary situation appears to make the latter improbable. It seems to be generally desired by both parties in congress to complete national defense and other necessary legislation and adjourn before the national conventions begin in June, and rather than to render this impossible by filibustering, the bill apparently would be allowed to pass the senate.

Storage Battery for Emergency Lights

In compliance with the regulations of the steamboat inspection service of the department of commerce, requiring auxiliary lights, with an independent source of power, on passenger vessels, a number of such vessels at Baltimore, Md., have been equipped with emergency lights, using the emergency radio storage battery as an auxiliary source of power to operate their emergency lights. The auxiliary power furnished for the wireless telegraph is thus made to serve for emergency lighting.

In order that the storage battery shall be properly charged, a charging panel board has been designed by Radio Inspector R. Y. Cadmus, of the bureau of navigation, department of commerce, which apparently meets these requirements. The board is so equipped as to disconnect automatically the charging circuit when the battery has been charged. Should the lights be used for purposes other than emergency, the sangamometer (the instrument used to show the amount of current put in or taken out of a storage battery) can be so set as to cut out these lights when the discharge reaches a certain point, thereby reserving the necessary emergency supply. The board is equipped with overload and underload automatic switches to prevent excessive charging. It is simple in construction and comparatively inexpensive. Should an accident require the use of emergency lights an officer or wheelsman on the bridge throws one switch or presses a push button on the steering head of the wheel.

Emergency lights are placed in the main passageways; in the passageways leading to the staterooms; over the doors leading to the decks; on the stairways leading to the lifeboat decks; on the boat deck in immediate vicinity of lifeboats and rafts, and the auxiliary current is also connected with the signal lights of the vessel.

These lights are arranged on three circuits, one for each deck, leading to the charging panel. These circuits consist of two parallel wires run through a lead cable. Should one of the lamps get broken the circuit is not interrupted. On the freight deck three-ampere fuses are used; on the passenger deck five-ampere fuses are used, and on the boat deck 10-ampere fuses are used. In the event of an accident should the water reach the freight deck circuit the lower fuses will blow, allowing the lights on the upper decks to remain lighted. These auxiliary lights can be so placed as to illuminate the lifeboats, so that in case of accident light is provided to the last where most needed.

Rush Work on Terminals

THE construction work at the Pacific terminals, Panama canal, which includes the construction of the 1,000-foot dry dock, a coaling plant and new wharves and piers, as well as the operation of the Sosa Hill quarry for the east breakwater has been pushed forward during the dry season as much as possible. Considerable delay has been experienced on account of the non-delivery of material ordered from the United States. In order to hasten the work the force has been greatly increased and in many instances two and three shifts have been worked.

It is the intention to have the dry dock and the entrance basin in such shape that it will be possible to break the cofferdam and allow water to come against the dock gate within a short time. In order to allow this, work is being advanced rapidly on the reinforced concrete pontoons on the floor of the dry dock, the installation of the green-heart on the dock gate, the placing of the flooding and sluice valves, and all other work below water level. Progress on the installation of the dry dock pumping plant has been very satisfactory and the condition of the valves and bulkheads, as well as the dock gate, will be such that work can be continued in the pump well and machinery rooms even after the flooding behind the cofferdam.

The work on the unloader and reloader wharves for the coaling plant at Balboa has been pushed, employing three shifts on nearly all items of the work. A great deal of difficulty has been experienced in placing the foundations of these wharves in the vicinity of and through the cofferdam, and it has been necessary to use care in blasting and excavating the rock in this vicinity. The pouring of concrete in the superstructure of the two wharves is going on, as well as excavation for the wharf anchorages. The unloader towers of the coal handling plant are already erected and during the past month the erection of the reloader towers and the transformer house has been under way.

The masonry work for the foundations for the extension of the entrance pier on the north side of the entrance basin, which was authorized early in the year, has been completed and the erection of the superstructure has been begun. Fender piles are being driven in place.

The work on wharves and piers consists of completing docks Nos. 13 and 14 and pier No. 18. The placing of anchors behind docks Nos. 13 and 14, and the placing of fill has engaged a large force. Upon the receipt of the steel framework for the shed on pier No. 18, all items of work have advanced, and it is estimated that in a few days the south half of the pier, facing No. 1 slip, will be ready for use. The work has consisted of erection of the steel work, the building of the concrete walls of the shed and offices, the installation of piping and conduits, painting the exposed steel work, placing the tile roofing, and placing anchors through the pier, preparatory to paving the middle portion of the pier floor.

The work around the shops has consisted principally of placing fill, grading off the yards, and the installing of the permanent roads and tracks.

Sosa Hill quarry, which has been operated for the past six months on account of the east breakwater in Limon bay, has produced 430,000 cubic yards of rock. Six shovels have worked on the two levels for eight hours per day until the last two months, when the number of shovels was reduced to four.

The city of Philadelphia has leased every inch of wharf or bulkhead in its possession, receiving $180,000 in annual rentals. The Pennsylvania railroad has taken pier No. 16, at a rental of $20,000 a year.

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188,000 Men in American Marine

Returns to the bureau of navigation, department of commerce, show that on June 30, 1915, the 26,701 merchant vessels of the United States documented for foreign or domestic trade were manned by 152,133 officers and men, excluding masters. In addition 1,556 yachts were manned by 7,531 men, excluding masters. The combined total is 159,664, to which may be added 28,257 masters, making a grand total of 187,921 officers and men for 28,257 documented merchant vessels and yachts, aggregating 8,487,331 gross tons.

For comparison, the merchant ships of Great Britain in 1913, aggregating 19,100,000 gross tons (excluding British colonies) were manned by 292,057 officers and men, including masters. In 1913 the German merchant fleet, aggregating 5,428,175 gross tons, was manned by 91,169 masters, officers and men. The number of vessels and crews (excluding masters) on all documented merchant vessels and yachts of the United States on June 30, 1915, is given in the accompanying table.

Plan Coast and Geodetic Survey Work

The United States coast and geodetic survey is making plans for its work during the coming season. Two of its vessels, PATTERSON and EXPLORER, are in the East Waterway, Seattle harbor, completing the annual repairs needed to fit them for work in the sheltered and nearby coast waters of southeast Alaska. The little steamer TAKU will continue work in Prince William sound. There will be no other surveying vessels in Alaska this season.

GEDNEY and MCARTHUR were condemned and sold the past winter, and, as a partial offset to their loss, the remaining vessels and two wire-drag parties will begin the season's work in April, about one month earlier than in previous years. It is expected that a real advance will be made this season in the comprehensive survey of the coasts.

To PATTERSON have been assigned the passages leading southward from Wrangell and Sumner Straits, including Kashevarof Passage, Rocky Bay and tributaries, Zimovia Strait, Eastern Passage, Blake Channel, and Ernest Sound. EXPLORER will survey the outer coast of Dall and other islands northward from Cape Muzon, including the important fishing banks in the vicinity of Forrester Island, and the unsurveyed dangers between the latter island and the coast. The launch, or little steamer, COSMOS, will work in conjunction with EXPLORER.

The two wire-drag parties, which will work partly in conjunction with PATTERSON this season, will endeavor to complete the main channels from Clarence Strait to Wrangell Strait, the through channels from Ernest Sound to Wrangell, and the main channel of Sumner Strait from Wrangell to Cape Decision, including the broken area northward of Coronation Island.

Captains J. F. Pratt and Ferdinand Westdahl, in charge of the suboffices of the coast and geodetic survey at Seattle and San Francisco, respectively, have complete files of the charts and other publications relating to the coasts of the United States and Alaska, for reference purposes, for the use of the public.

Lowers Age Limit

Heretofore it has been a requirement of the steamboat inspection service of the department of commerce, that persons who obtain marine licenses shall be 21 years of age. The federal board of supervising inspectors of steam vessels has amended the rule with reference to age, so that now any person who has attained the age of 19 years and has had the necessary experience, shall be eligible for examination for license. This action has been approved by the secretary of commerce and has gone into effect.

Cargo Rulings

Following is a summary of recent rulings made by the steamboat inspection service, relating to the transportation of certain articles on steam vessels carrying passengers:

Vermicide may be transported on steamers carrying passengers under the same conditions as refined petroleum, but it shall not be used as stores on either passenger or pleasure steamers.

Buck brand metal polish shall not be transported on steamers carrying passengers, nor shall it be used as stores on passenger or pleasure steamers.

Empty receptacles that have been filled with gasoline shall not be transported on steamers carrying passengers.

Needs Government Aid

S. G. Schermerhorn, executive vice president of the United Fruit Co., declared recently that to establish an American merchant marine government aid and not government ownership is necessary. "Government ownership, which means government competition, would have a grave tendency to repel rather than attract the investment of private capital," said Mr. Schermerhorn, "and instead of an increase in the number of vessels sailing under the American flag a big decrease would be the inevitable result. By government aid I do not necessarily mean subsidies assuring profits to owners of American bottoms in foreign trade but rather aid to enable the American owner to meet foreign competition on a basis more equitable than is at present possible. This would insure to the private owner the co-operation instead of the competition of the government and, as is provided for in the bill prepared by the New York Chamber of Commerce, nothing would be done without the sanction of the government shipping board."

Eighty three vessels are ice-blocked in Kola Bay, Russia, waiting to discharge their cargoes, consisting principally of munitions, at Archangel, according to latest reports. Navigation is expected to be open before long, and efforts will be made to hasten the opening by the use of ice-breakers.

Number of Men in American Vessels

	Seagoing. Vessels.	Seagoing. Crew.	Great Lakes. Vessels.	Great Lakes. Crew.	All other. Vessels.	All other. Crew.	Total. Vessels.	Total. Crew.
Merchant vessels:								
Sail	1,364	10,507	220	1,281	4,281	14,207	5,866	25,995
Steam	1,178	41,041	1,615	21,061	4,159	37,617	6,952	99,719
Motor	45	521	733	1,440	8,218	19,504	8,996	21,465
Unrigged	.....	.....	.....	.....	*a*4,887	4,954	4,887	4,594
Total	2,587	52,069	2,568	23,782	21,546	76,282	26,701	152,133
Yachts:								
Sail	112	734	17	46	70	247	199	1,027
Steam	297	2,803	75	131	26	492	308	3,426
Motor	375	1,467	140	276	509	1,288	1,024	3,031
Unrigged	.....	.....	.....	.....	*b* 5	47	25	47
Total	694	5,004	232	453	630	2,074	1,556	7,531

a This total embraces all unrigged vessels without regard to the waters on which they navigate.

b This total embraces all houseboats without regard to the waters on which they navigate.

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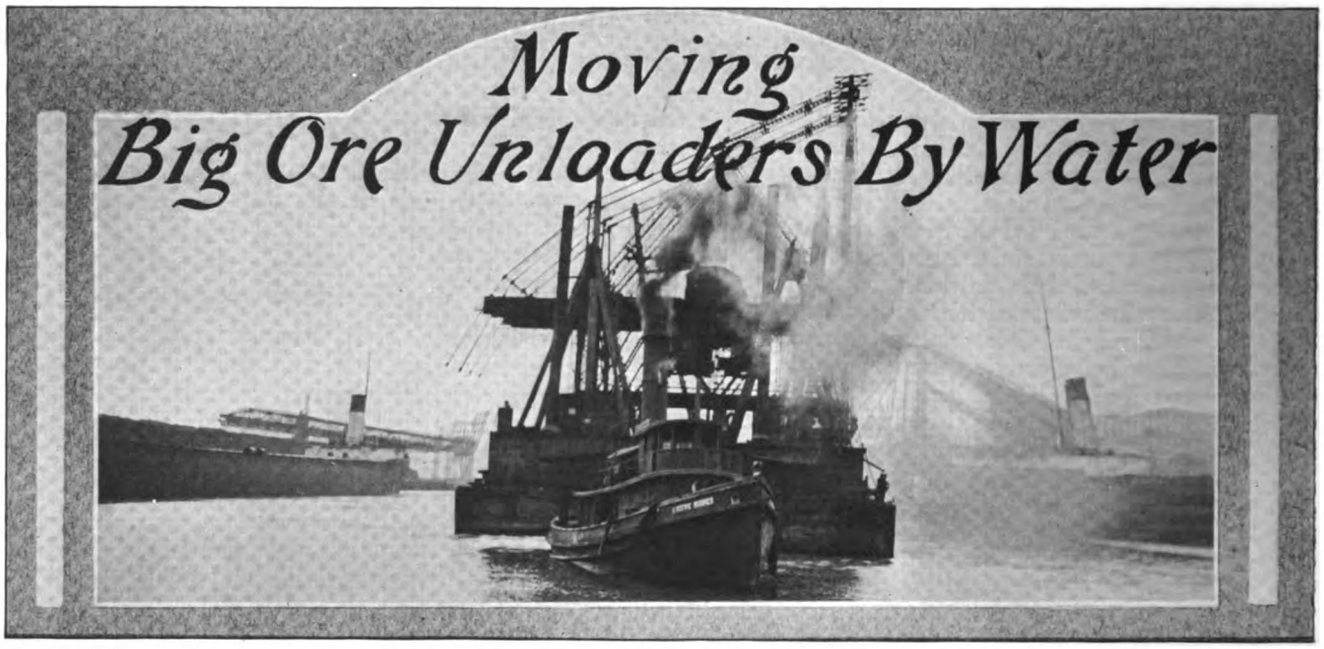
Moving Big Ore Unloaders By Water



ENGINEERING problems of a novel and interesting character were recently solved by the engineering staff of the Pittsburgh & Conneaut Dock Co., Conneaut, O., when the accession of new equipment made it necessary to transport four Brown 5-ton electric ore unloaders from the company's No. 4 dock to its No. 2 dock, across the harbor slip and about 3,000 feet south of the former position. As shown in Fig. 1, the original equipment of No. 4 dock included the Brown machines, four Hulett 10-ton hydraulic unloaders and one 17-ton Hulett electric unloader. Having purchased two new Hulett 17-ton electric machines, and desiring to keep the units of each type together as far as possible, the company decided to erect the new machines on No. 4 dock in place of the Brown machines, making room for the latter on No. 2 dock by dismantling some of the older equipment. This operation involved turning the unloaders about en route so as to face east instead of west, as formerly.

The feasibility of moving the machines to their new position by rail was first considered by P. J. Fickinger, chief engineer, and his associates. This proved out of the question, the machines in their original form being too wide and high to go under the swing bridges which had to be negotiated. It appeared equally inadvisable to cut the unloaders down and re-erect them on the new site, as the cost of cold cutting and re-erecting, with the ensuing duplication of falsework and incidental staging, etc., would have more than doubled the cost of erecting new equipment. It was at length decided to move the machines by water. This idea was suggested to Mr. Fickinger by his recollection of floating bridge spans, erected on barges, into place on the Ohio river at Pittsburgh. This feat, he declared, was accomplished on a navigable stream in New Zealand more than 30 years ago.

The use of two wooden barges, each of 1,200 tons capacity, was secured from the Coast & Lakes Contracting Corporation. These were of the derrick scow type, 200 feet in length and 41 feet beam, with a 20-ton derrick at either end. The problem of getting the machines on and off the barges without straining the structural work now presented itself. The flexibility of the unloaders' construction made the task especially difficult. Inasmuch as the track on which they were operated ran parallel with the face of the dock, while their removal involved moving them at right angles to the dock, it became necessary to devise a new means of transporting the bridges to the barges. Mr. Fickinger and his associates at first planned to build a tramway with rollers; but this plan was abandoned, owing to the danger of the rollers imparting severe and constantly varying stresses to the structures. A scheme of using skids to slide the machines into place on the barges was likewise given up on account of the danger to which the fabric would be subjected by the severe stresses generated by the sudden and radical changes from a high static friction to a low moving friction load, causing the structure to move by jerks.

In order to move the unloaders onto the barges with the least friction, and to adjust the inevitable stresses under the principal members in the same manner in which they were designed to be stressed in service, a new set of four-wheeled, partially equalized trucks, equipped with universal joints, was designed and built by the dock company. These trucks took the place of the

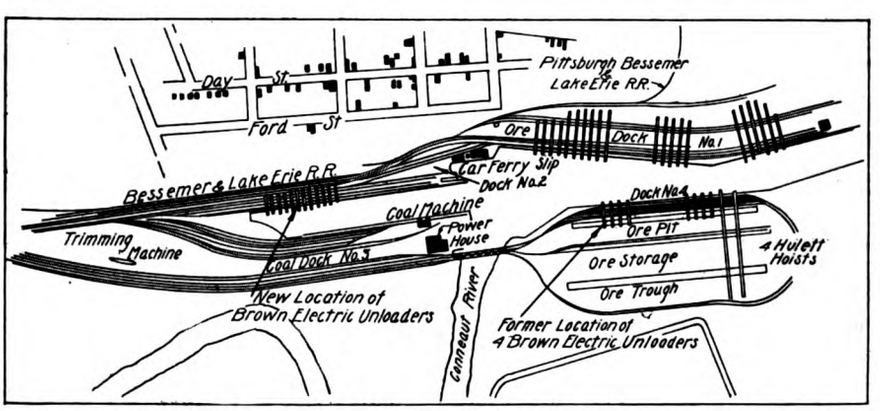


FIG. 1—PLAN OF SLIP AND DOCKS SHOWING FORMER AND PRESENT LOCATION OF UNLOADERS

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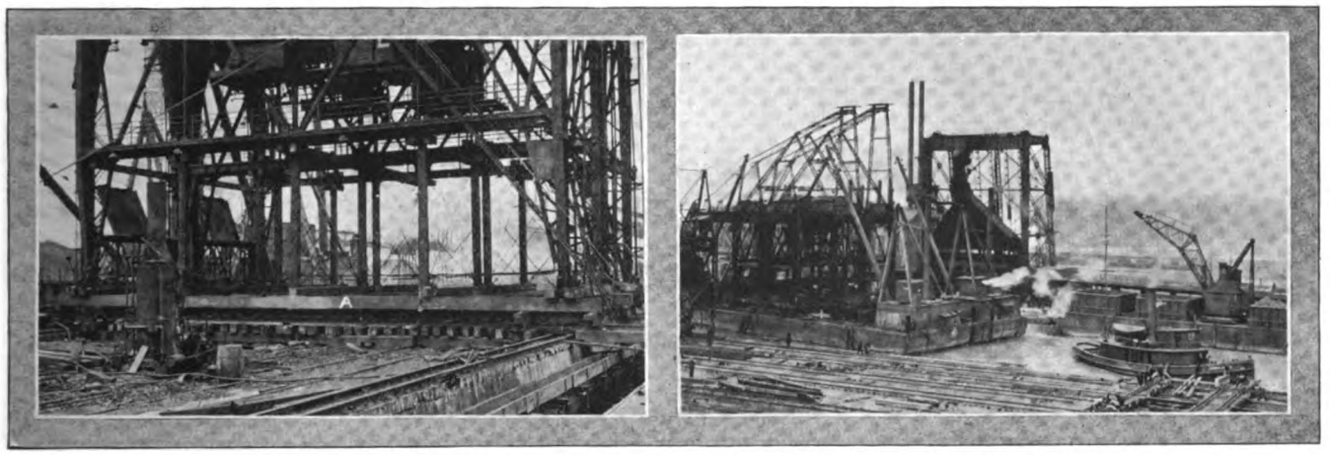

FIG. 2—UNLOADERS ON BARGES SHOWING FALSEWORK

FIG. 3—MACHINES NEARING THEIR DESTINATION

trucks originally supplied with the machines, facing, of course, at right angles to the previous axis of operation. Their construction is illustrated in Fig. 5, and they may be seen in use in Fig. 2.

The next problem was that of securing the maximum amount of stability possible with the dimensions of the machines. As these measured 98 feet in height over all, with a width of 24 feet and a total length, excluding the cantilever, of 62 feet 10 inches, it was decided to couple two machines together so as to handle them in pairs. This gave a total wheelbase, for each pair, of 48 feet. The cantilevers were removed and the machines linked together by means of 10 x 16-inch Douglas fir sills and 12 x 12-inch Douglas fir caps bolted together as illustrated in Fig. 2, which also shows the method of cross bracing by means of steel tie rods.

In order to stabilize the two barges, as far as possible, and to provide adequate room for handling the machines, they were lashed together, the aprons and cantilevers of the unloaders being utilized for strongbacks across their decks. With the barges separated by a distance of 18 inches, timbers 12 inches square were passed underneath at bow and stern. Bolts were then passed through the aprons, down between the barges, and through the timbers beneath, locking the barges together. Five wraps of 1⅛-inch cable were then fetched around the two barges at either end. This cable was drawn taut, the tension upon it being increased by means of wedges.

Some Difficulties Surmounted

Extreme care was required to properly secure the barges to the dock, in order to receive the load without causing a pronounced list in the barge nearest the dock. Another point to be considered was the fact that when most of the weight of the machines, representing nearly 150 tons each, was on the barges, their after ends still remaining on the dock, the stresses were reversed.

Again, when the unloading machines were completely drawn onto the barges, the load on the extreme outer edge of each would tend to cause a reciprocal outward list. This was forestalled by blocking under the central post shown at *A* in Fig 2, thus distributing the strains more equitably and bringing both barges onto an even keel, with increased stability. The unloaders were successfully drawn aboard the barges over a carefully prepared track, the inequality in height between the barges and the dock being adequately cared for by the universal joint design of the trucks, into which the legs of the machines fitted, equalizing all stresses. In moving the machines, a hoisting engine equipped with suitable blocks and falls was utilized. One tug was employed in towing the machines to their new destination, this operation including winding the unique craft in mid-channel, so that the unloaders would face east instead of west when landed.

The unloaders were drawn ashore by methods practically a replica of those used in the embarkation, and were placed on previously constructed foundations. Fig. 3 shows the machines nearing the new site, as well as the tracks over which they were hauled to the foundations. Only one day was consumed in moving each pair of unloaders from their original position to the permanent location.

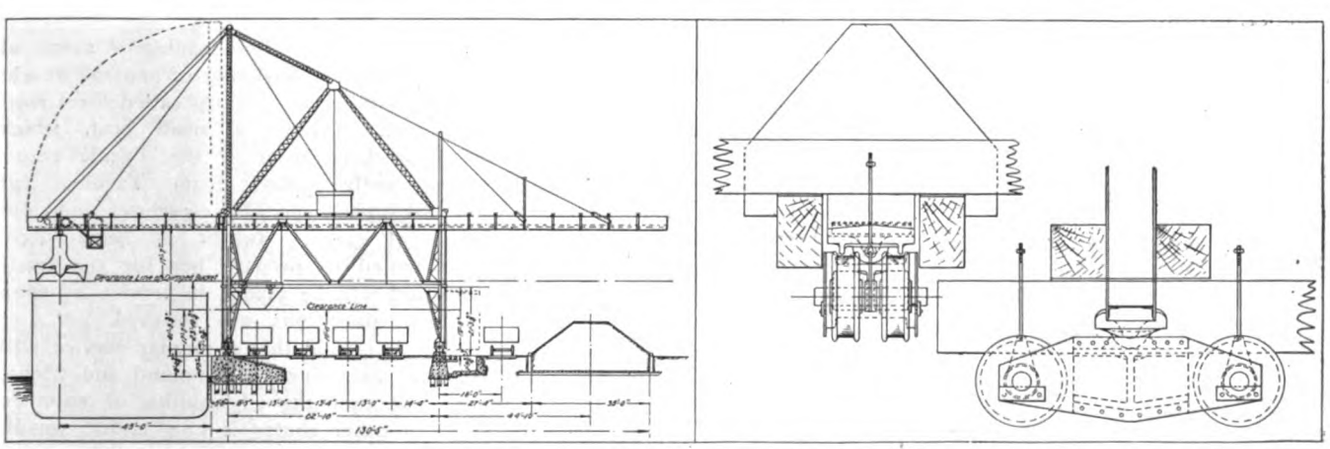

FIG. 4—PLAN OF BROWN ELECTRIC UNLOADING MACHINE

FIG. 5—SPECIAL TRUCKS DESIGNED FOR MOVING UNLOADING MACHINES

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In the Traffic Manager's Office

A Review of the Charter Market on Coasts and Lakes—Pointers for the Men Who Get the Business

Allies' Conference Arouses Interest

THAT the recent conference of allied leaders at Paris may have some important effects on steamship affairs is thought more than possible, especially since the statement was issued that the British mercantile marine would be rehabilitated to meet the urgent requirements of France, Italy and Russia. The latter countries for the past five months have been vigorously complaining of the burdensome freight rates that they were being forced to pay to British steamship owners, while the British government, exercising its prerogative, has, for its own use, put limitations on the rates of freight that it pays. This constant reiteration of complaints that England should put its mercantile fleet to the use of all of the Allies is thought to be the basis of the impending change. It was recently asserted that England would probably take over every steamer under its control and would regulate their activities in such a way that they would be centralized on war transportation mainly. It was pointed out by this shipping man that hundreds of British steamers were under charters to American shippers, these charters not expiring for six months, a year and longer. However, the British government has the power to force a British ship owner to cancel such charters and it is the loss of such chartered tonnage that is expected to create a maelstrom in the shipping world.

Probable Effect on Rates

With the British tonnage under rigid government control it will be natural that the premiums on neutral tonnage will soar to still higher levels. American, Norwegian, Dutch, Swedish and other neutral vessels will find hundreds of shippers demanding tonnage that will be required to fill the void created by the withdrawal of the British merchant marine.

During March freight rates maintained a steady upward movement. Quite a little chartering was done in grain cargoes from Montreal to the other side for loading in May. To a larger extent the grain trade is under control of the British government which supplies its requisitioned steamers for the transportation of grain. Thus the freight rate on grain to England is inclined to be easy. To other countries, however, the rate is very firm. In flour cargoes there is a very firm market, as high as 120s being offered for April loading northern range to French Atlantic ports, while early in the month a number of steamers were fixed at 110s.

The improvement in freight movement to South America has been one of the bright features of the shipping world. Neutral tonnage is finding numerous offers to take cargoes to South America, especially coal, and as high as 105s has been paid for steamers to take coal from Virginia to the River Plate, while to Rio Janeiro $20 per ton is the market.

Cunard Buys Five Ships

Announcement of the purchase of five steamships, with a total tonnage of 31,087 tons gross, by the Cunard Line was recently made by that company. The ships will be used to carry freight between New York and Great Britain. Officials say the ships already are in its service, and are all of British register.

The ships and the new names they will be given by the Cunard Line are: ANGLO-CALIFORNIA, renamed VANDALIA; ANGLO-BOLIVIAN, renamed VINOVIA; DEN OF AIRLIE, renamed VALERIA; DEN OF OGIL, renamed VALODIA, and LUCERIC, renamed VALACIA. The purchase price was not made public. ANGLO-CALIFORNIA and ANGLO-BOLIVIAN will sail under their new names. The others will receive their new names at the end of their voyages.

The steel steamer CHARLES BEATTY, owned by the Volunteer Transit Co., Cleveland, has been sold to a southern sugar firm with offices in New Orleans, through a New York broker, for approximately $100,000. She will be operated between New Orleans and Cuba in the sugar trade. The steamer is now laid up at Ogdensburg, but is expected to leave for the Atlantic coast early this season. She will be refitted for salt water service before leaving for the coast. BEATTY was built in Toledo in 1902, and her capacity is 1,800 tons. She is 204 feet in length, 40 feet beam and 16 feet deep.

Organizes New Fleet

Plans of the new Garland Steamship Corporation, which was recently chartered with a capital of $1,900,000, are not entirely completed yet, but it has been decided to operate a regular service between some Atlantic port, probably Baltimore, and England, and between a Pacific coast port and China. The company has already bought a fleet of five steamers, and two of them are now in operation, while one is being altered to meet the requirements of the company's business. Efforts will probably be made later to add other vessels to the fleet, but no steps in this direction have yet been taken.

The ships which the company has acquired include CAROLINA, until recently operating under the name SOUTHERNER, JAVARY, JUSTIN, formerly a United States government collier, and two other ships.

CAROLINA, after loading a cargo at Baltimore consisting of general freight and tobacco, recently sailed for Liverpool. JAVARY, a small boat, which has been used in the Pacific trade, recently sailed from Tacoma for Shanghai, carrying cigarettes and general cargo. JUSTIN is being overhauled to prepare her for the trade and will be placed in service as soon as alterations are finished.

It is said that a regular service will be maintained to England and China, and that the advisability of entering on other routes is now under consideration.

It is the intention of the company

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to operate its vessels under the American flag for the present at least. Provided the seamen's act should prove too much of a restriction in the Pacific trade, the vessels will probably be transferred to the Chinese or Japanese flag.

Lines Charter Fleets

The American-Hawaiian Line and the Luckenbach Line, which decided to charter their fleets for time or trip charters, since their withdrawal from the alternative Panama service, are making fair-sized profits out of the high charter rates which their vessels are able to command.

On charters placed with the United States & Brazil Line, many of the American-Hawaiian vessels now stand excellent chances of returning to their owners within the next few months their original costs, if not even more than that. The steamer IOWAN has been chartered to the steamship subsidiary of the Steel Corporation at a rate of about $90,000 a month. Within successive periods of 10 days each, the American-Hawaiian Line has likewise chartered its steamers COLUMBIAN, ARIZONIAN, OREGONIAN, CALIFORNIAN, MONTANAN, PENNSYLVANIAN and HAWAIIAN, and with each new charter the rates stipulated have been increasing. Thus, COLUMBIAN has been chartered out for approximately $122,000 a month, OREGONIAN and CALIFORNIAN are believed to have brought even higher charter prices, while ARIZONIAN has been let out for a two-trip charter to Brazil for the neat sum of $146,000 per month.

Charters for the American-Hawaiian vessels have been practically limited to the South American route. This is due to the fact that on those routes the vessels are not exposed to the war hazards which they would meet in the European zones and operation costs are also not as high at present in the South American trade. The steamers can also be turned around more rapidly at South American ports than they can at European ports.

The United States Steel Corporation has been practically the sole charterer of the American-Hawaiian ships, working through various steamship agencies. While many independent steel companies have been and are now experiencing serious difficulties owing to the shortage of ferro-manganese and the consequent advance in the price of spiegeleisen and ferro-silicon, the Steel Corporation has been able to place itself in a strong position because of the far-sightedness of its officials. More than a dozen large steamers are now being continuously employed by the Steel Corporation in carrying manganese ore from Brazil to this country and the Corporation has three furnaces making ferro-manganese and two turning out spiegeleisen. While the charter prices paid by the American-Hawaiian vessels which have been called into such service are admittedly high, the great need for the manganese ore, it is believed, has warranted the expenditure and the advance in steel prices is said to have practically made up the difference.

Controling British Marine in War Times

AN interesting and detailed report on the working system of the transport department of the British admiralty, which has under requisition approximately 1,800 British ocean-going steamers, is published in the Liverpool *Journal of Commerce*. The report is made by T. Paterson Purdie, president of the Clyde Steamship Owners' Association and a member of the British government ship licensing committee, and is based on observations during an official visit which Mr. Purdie recently paid to the department.

A card index in maintained with a card for every ship in the mercantile marine. These cards are distinguished into 28 classes by colors and "tabs", and movable colored signals, which are changed day by day, follow the movements of the ships and show at a glance in what area of the world each ship is at any moment. This card index enables the transport department, when new requirements have to be met, to obtain at short notice a complete list of all the possible suitable vessels.

Full information is registered and brought up to date by monthly returns from each owner, and also by reports each day as actual charters are made, showing on what employment their vessels are engaged, so that the transport department has full information in a readily accessible form of just what each of the 6,000 or so possible vessels are doing.

An elaborate system is also maintained to show at a glance what previous service under requisition each owner has done in the period during which market rates have risen considerably above requisition rates. This system takes into account the number of ships in the owner's fleet, the time each of them has been engaged, the size of the ships, and also the number in service at the moment.

Before new requirements are met, a special list is made out from the above records showing all the possible vessels which are of the right type and in the right position for the services in question. On such a list is shown (a) the service on which the vessel is engaged, (b) what cargo she would be carrying if left free from requisition, (c) her size, type, etc., (d) her exact position, and lastly (e) a figure showing just how the owner's previous service compares with other owners' service. This list is then examined with great care, so that the transport department may choose, first of all, the ships that are most suitable for the service and the proper position; secondly, those whose requisitioning involves the least possible disturbance of other important service and least dislocation of industry, and thirdly, so far as these primary considerations allow, those which belong to the owners who have done less than the average amount of previous service for the government.

A vessel is never requisitioned except on the expert advice that she is entirely suitable for the service or the most suitable of those available, and after the most careful consideration of the effect the requisition will have upon the industry of the country and its ordinary overseas trade.

Around the walls of the statistical department were full lists with the ships' names and positions corrected and kept up to date as telegrams came in daily and nightly advising the movements of each ship.

Once a ship is requisitioned the nature of the control exercised by the transport department necessarily depends upon the particular work to which it is allotted. If it is sent to bring stores to Great Britain, the work is more or less commercial in character, and the vessel can be as completely controled and as effectively managed as under commercial conditions. If, however, the vessel is allotted to attend on the fleet, it is obvious that its management must depend upon many considerations which do not have to be taken into account in commercial undertakings. It must partly depend upon strategical necessities and be largely, therefore, determined by the arrangements of the naval authorities, though there is, in

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fact, a close and constant supervision at the admiralty. Similarly, it is obvious that a vessel engaged in immediate association with military operations often cannot be managed in the same way, or upon the same principles, as if it were engaged in a commercial enterprise.

The release, or return, or even the discharge of that ship is dependent on the dominating circumstances existing at the position to which she has gone. What may seem to us shipping men a serious loss of time is considered by our service commanders a vital necessity for the successful prosecution of their work with the entire forces under their respective commands.

With regard to the vessels that are requisitioned for civil work, such as the carriage of foodstuffs, wheat, grain, sugar, etc., or for nitrates and materials for the munitions departments, these are operated on commercial lines, as the transport department has appointed as agents shipping firms of the highest standing, and full local knowledge and experience, at all the principal ports at home and abroad, who attend to the loading, discharging and other work incidental to ship management, with the view of operating each ship on strictly business lines to insure its most economical use.

To control 1,800 ships of all types and classes is a stupendous undertaking, even when that control is paramount throughout every operation of the ships.

Report Shows Prosperity

President Galen L. Stone, of the Atlantic, Gulf & West Indies Steamship Lines, says that the company has 11 ships under construction, of which nine should be delivered during the current year. They will represent a cost of almost $7,000,000. Mr. Stone declares that there is every reason to believe that the boats will be paid for from the current resources of the business without the sale of additional securities. He asserts that the company has a substantial working capital, including $4,200,000 in cash. Commenting on the declaration of a dividend of $1 per share on the preferred stock, Mr. Stone says:

"Many inquiries have been made as to whether this first declaration of a dividend of $1 per share on the preferred shares of Atlantic, Gulf & West Indies can be construed as an indication of quarterly dividends of the same amount. It has been the practice of the management to furnish to the shareholders and the public an annual balance sheet showing the financial position of the holding company, and a consolidated balance sheet showing the financial position of the principal subsidiary corporations owned and controled by the former. It has also been the practice of the management to publish as promptly as possible each month a statement showing the revenues, expenses and current deductions of the principal subsidiary operating companies.

"The only financial factors producing the income account of the system as a whole, which are not published, are the income and outgo of the holding company. The miscellaneous income less outgo, excluding the interest on the collateral trust bonds of the holding company amounted in 1915 to about $135,000. It is well known that the interest on the collateral trust bond amounts to about $620,000. With these factors in their possession, stockholders are in about as good a position as directors to judge as to what may properly be expected in way of dividends."

Opens River Barge Line

By H. H. Dunn

THE biggest single event in shipping circles in the south during April was the arrival at New Orleans, near the end of that month, of the 1,600-ton self-propelled, steel barge INCO No. 1, from St. Louis on the maiden trip of what is to be a regular trunk line service of large gas-driven barges between the Missouri and the Louisiana port. The barge, which is quadruple screw, driven by Fairbanks-Morse engines, made 9 miles an hour upstream and 13 down the river, at her trial trip at Cincinnati in March. She was built at Jeffersonville, Ind., and went thence to Cincinnati, Louisville and St. Louis, arriving at the latter point, for cargo, April 12. She left there about two days later, and proceeded to New Orleans with a full cargo, traveling slowly and stopping at all river towns so as to give the shippers and steamboat men of each an opportunity to see the new boat in service. Two other barges of the same size as INCO No. 1—whose name, by the way, is taken from the initials of the Inland Navigation Co., her owner—have been launched at the Indiana yards and four others are in process of construction. The full fleet planned by the $5,000,000 corporation, previously described in *The Marine Review*, is to consist of 35 barges, some of them capable of carrying as much as 3,000 tons.

Organization of a distributing and collecting service for the freight carried by the new barge line has been formed among steamship companies operating on the river. This traffic association will give wide distribution to freight deposited by the barges at ports along the Mississippi and will bring other freight from towns to feeder waterways which empty into the Mississippi. Parties to the new organization are the Inland Navigation Co., owner of the barges; the Lee Line, operating out of Memphis, Tenn.; the Streckfus Line, between St. Louis and Minneapolis; the Kansas City-Missouri Transportation Co., between Kansas City and St. Louis; the Chattanooga Packet Co., on the Tennessee and Ohio rivers; the Wishard Line, on the Illinois river, and the Eagle Line, between St. Louis and Peoria, Ill.

Organize New Line

The Potter Transportation Co., New York, has been organized to operate and manage steamers, tugs and barges in the coastwise and foreign trade. The company has acquired recently the D. L. & W. fleet of tugs and barges, 19 in all, and will also manage the Potter Steamship Co., which has purchased a 4,000-ton steel ocean-going steamer under construction, with delivery promised about the end of May. Officers of the company are Charles H. Potter, president; C. E. Gremmels, vice president, and W. G. Edinburg, secretary and treasurer.

Congestion at Hongkong

The general freight situation in Hongkong and eastern ports, it is said, has come to a serious condition. Practically, every warehouse in Hongkong is full of freight awaiting shipment. There is especially strong demand in the United States for rubber from the East Indies, tin, gunny bags and jute. The demand for these products is so strong that practically no other cargo is going forward in the larger and faster ships. Five thousand tons of such valuable cargo is in the warehouse of one company alone, awaiting space. Practically nothing at the present time is going forward in the way of ordinary Chinese merchandise. The result is that trade in some of the principal commodities in South China at present is practically at a standstill and at this time there is little or no prospect of any improvement in the situation as re-

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gards such cargo. The minimum rate on freight from Hongkong, Amoy, Foochow, Keelung, and Manila to San Francisco, Portland, Ore.; Tacoma, Seattle, Victoria and Vancouver by the new tariff is $12 gold a ton of 2,000 pounds, or 40 cubic feet at ship's option, and the rate runs to $30 gold per ton on more valuable cargo plus an additional ad valorem charge for the most valuable goods. The rates are effective for the Toyo Kisen Kaisha, the Royal Mail Steam Packet Co., the Ocean Steamship Co., Ltd., the Java-Pacific Line, the Glen Line, the Royal Mail Steamship Line, the China Mutual Steam Navigation Co., the China Mail Steamship Co., the Canadian Pacific Railway Co.'s Line, and the Bank Line, Ltd.

Freight Tie-Up in East

Freight congestion at New York is a railroad problem and can be handled only by railroad men, according to steamship operators. Officials of leading steamship lines out of New York say that while they would be ready to meet with other committees to discuss the freight accumulation situation, in their opinion such conferences would not only fail to produce results, but would be a waste of time.

Protest has been made by shippers that while the railroads and the consignees were combining to reduce congestion, the steamship men showed no disposition to co-operate with them. "The steamship lines are not congested," declares the manager of the freight department of a large steamship company. "They are ready to take merchandise as rapidly as it is furnished. There is a lack of tonnage, but that is not due to the fault of the ship companies and cannot be remedied by them. The railroads and shippers knew there was not sufficient tonnage to accommodate the flood of traffic through New York and should have taken measures accordingly.

"The steamship lines are not directly concerned with the causes of congestion at the piers and terminals. We know that deliveries are not made regularly, and for that reason loading is delayed. The routine of loading a vessel is fixed and if lighters are late they cannot avoid being held back.

"The heavy freight must go into a vessel at the bottom. If we notify the railroads to deliver steel rails on Monday, and they do not arrive until Thursday, the loading of the entire vessel would be tied up if we waited for them. At the present high freight rates we cannot afford to hold the vessels for late freight. It would be conservative to say the average loading of ships is delayed 50 per cent. We have had vessels here for 23 or 25 days which should have sailed in 10.

"The terminals and piers are crowded with merchandise for which no shipping space has been provided, I understand. To place an embargo on incoming freight will accomplish little result if some disposition is not made of the surplus merchandise on hand. I am not a railroad man, but it would seem that the best way to relieve the terminal situation would be to move such freight back inland and to make way for goods with shipping space already provided.

"Under present conditions steamers for Australia and other points find it impossible to get cargoes because of the congestion caused by shipments to Europe. Yet, our vessels lie along the piers and wait for deliveries.

"The steamship men are in no way responsible for the strikes, storms and other incidents which have caused trouble on the railroads. If we felt any good would result we would gladly discuss matters, but effective action is the only thing I can see that is needed from us."

The four-masted steel bark EDWARD SEWALL, one of the largest sailing vessels ever built in this country, has been purchased by the Texas Oil Co. from Arthur Sewall & Co., Baltimore. The new owner will convert her into an oil-burning steamer. She is to be used as a tank ship. She is 332 feet long, 45.3 feet wide and 25.5 feet in depth, has a tonnage of 3,206 gross, carries 34 sails and was built in 1899 at Bath, Me., by Arthur Sewall & Co.

Neutral Shipping Suffers Heavily

NEUTRAL vessels which have been destroyed directly or indirectly as a result of the European war during the 20 months of its course number approximately 212, representing a total tonnage of 306,209 gross tons. Thirty-five of these ships, according to the *Journal of Commerce*, of 72,885 gross tons, have been lost since the first of the year, indicating that the general average of about 10 a month has only been slightly exceeded during the three months of 1916, although the size of the ships destroyed has been larger. The nations whose tonnage has been affected are the United States, Norway, Sweden, Denmark, Holland, Spain and Greece.

The subjoined table shows the number, tonnage and nationality of steam and sailing vessels destroyed in operations during the 20 months of war ending March 31, 1916, and shows also the number and tonnage of vessels owned in each of the countries listed. The tonnage given is the tonnage owned by each nation in gross for the steam vessels and net for the sailing vessels included therein:

	*1915-16.		†(20 mos.)	
Flag:	No.	Tons.	No.	Tons.
‡United States..	2,580	3,522,913	6	10,377
Danish	835	854,966	32	36,537
Dutch	809	1,522,547	32	74,127
Norwegian	2,174	2,529,188	89	123,303
Swedish	1,462	1,122,883	39	36,781
Spanish	642	899,204	..	.....
Greek	943	1,801,716	..	.....

*Neutral steam and sailing vessels owned according to Lloyds' Register Book.

†Neutral gross tons of sail and steam vessels destroyed in war.

‡Excluding vessels trading on the Great Lakes of North America.

Few American Ships Lost

The United States, with the largest total tonnage, has lost comparatively few ships as a result of the war. None has been destroyed so far this year, while COMMUNIPAW, of 3,170 gross tons, which was listed as lost on Jan. 1, has been raised, reducing the total tonnage destroyed to 10,377 gross tons.

The Scandinavian countries have suffered the severest losses, due to the mining of the waters in which their ships are operated. A considerable number of their vessels have also been destroyed by submarines. Norway heads the list with an aggregate loss of 89 vessels, but most of these were comparatively small and the total tonnage destroyed, 123,303 gross tons, is not proportionately as large as the loss suffered by some other nations.

With the further mining of the North sea and adjacent waters, following reports of pending naval activities and with the increasing operations of German submarines, navigation has become more dangerous and the risk has tended to restrict shipping, as indicated by the withdrawal from service of the Holland-America liner ROTTERDAM. It is interesting to note that while Holland has lost only 11 vessels since Jan. 1, as compared with 21 during the preceding 17 months, the tonnage destroyed in three months has been greater than the amount destroyed in the longer period.

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Only five neutral vessels of more than 5,000 tons have been destroyed, four of them belonging to Holland and one to Denmark. The following table shows the neutral ships of more than 4,000 gross tons destroyed either directly or indirectly as a result of the war:

	Gross tons.
Tubantia, Dutch	15,000
Konigen Emma, Dutch	9,181
Palembang, Dutch	6,674
Eemdijk, Dutch	6,180
Maryland, Danish	5,136
Tysla, Norwegian	4,676
Trondhjemfjord, Norwegian	4,248
Cathay, Danish	4,076

Will Control Traffic on Russian Waterways

Traffic on all of Russia's inland waterways is to be centrally controled along the lines that have already been adopted for railroad communications. A so-called central executive committee of waterways is to be established, which is to consist of the following members: The chief of the division of inland waterways and highways of the ministry of ways of communication, chairman; a vice chairman appointed by the minister of ways of communication, who is to be general manager of traffic on inland waterways; two members of the ministry of ways of communications, appointed by the minister; one member apiece from the ministries of war, marine, finance, trade and industry, agriculture and interior, and one from the imperial comptroller's office, appointed by the respective chiefs of the ministries and by the comptroller; one member apiece from the All-Russian union of zemstvos and cities and the central munitions committee, to be appointed by the union and the committee, respectively; one member apiece from the council of ship owners, the council of Volga boat owners, the council of Amur river boat owners and councils of boat owners of other regions.

The decisions of the committee that demand neither any changes in existing laws nor the expenditure of moneys are to take effect immediately; others, with the consent of the minister of ways of communication, who will put them into effect. The committee will have very broad powers of control over the time, route, destination and precedence of consignments; the requisition of boats, barges and tugs; the prices of space for shipping and towing; loading and unloading charges and the means and methods of loading and unloading; the pay, hiring and discharge of labor; and the purchase and sale of fuel and other necessary material. It will have the power to recommend that money loans be made to boat builders and repairers. The minister of ways of communication is empowered to appoint agents when and where it may be deemed wise by the committee, to supervise the movement of boats and goods under instructions to be issued by the committee.

America's Largest Diesel Engine Works

By H. W. Loweree

GROTON, Conn., is a small town situated on the east bank of New London harbor and besides being rich in historical remembrances of Colonial days and palatial residences, it may also boast of having the most extensive marine engine manufacturing plant in that section of the country. The New London Ship & Engine Co. is one of the pioneers in this country in the production of heavy or crude oil engines operating on the diesel principle. It was this company that built the first American marine diesel engines, about six years ago, under license from the Maschinenfabrik-Augsburg - Nurnberg, or, more compactly, the M. A. N. Co., of Nuremberg, Germany.

It was soon discovered that the original plant was too small, owing to the demand which immediately sprang up for these engines as soon as they were launched on the market. This demand has since grown to such phenomenal proportions that the company has been obliged to enlarge its plant on four different occasions. The present machine shop extends 500 feet along the shore front and contains more than 100,000 square feet of floor space under one roof. This building is exceptionally well lighted, heated and ventilated, considerable time and money having been expended in perfecting a model plant. The plant is now running night and day with 1,200 men employed, working in two shifts and there is a standing opening at the present time for 300 more machinists. In addition to the machine shop there is a large detached office building which also contains the draughting rooms of the Electric Boat Co.

Foundry Being Built

The company has also decided to make all its own castings and now has a large foundry under construction. It is nearly completed and will shortly be in operation.

This company also believes in its own product, as the power for operating the whole plant is furnished by two diesel engines. One is a 6-cylinder, four-cycle ordinary type of 120 horsepower, while the other is a special 2-cylinder stationary type of 200 horsepower. Both engines use crude oil as fuel and are direct connected to electric generators. Most of the shop tools are operated by individual motors connected to a 120-volt circuit. These two engines are in continuous operation night and day, only one man being required to attend them. Experiments are now being made with a single cylinder stationary, double acting, four-cycle engine working on the diesel principle which has developed 300 horsepower at 350 revolutions per minute.

More than $5,000,000 worth of the New London company's diesel engines of both the two and four-cycle types have already been sold to the United States and foreign governments for installation in submarines and other naval vessels, and for various types of commercial boats and yachts.

While engines operating on the diesel principle have heretofore been considered by many to be quite complicated; yet they are no more so than a steam engine when the boilers and necessary accessories are taken into consideration. The average machinist of ordinary intelligence or a steam engineer can, without the slightest trouble or special knowledge, learn to operate these engines very successfully in a very short time.

Economy in operation is the big feature. The 120-horsepower engine running in the shop in charge of an unskilled man (selected purposely for the test) and with a load varying from 50 to 130 horsepower, running eight hours a day for 30 consecutive days, gave the following results:

Total running time, per day, hours	8
Average B. H. P developed	91
Amount of fuel consumed, gallons	46
Pounds per B. H. P	0.47
Cost at 4 cents per gallon	$1.84
1 gallon of lubricating oil	0.30
Total cost fuel and oil	2.14

The cost of fuel and oil for a gasoline engine for a similar power run, based on a pint of gasoline per horsepower per hour at 20 cents per gallon, with a similar amount of lubricating oil, would be $18.50 per day,

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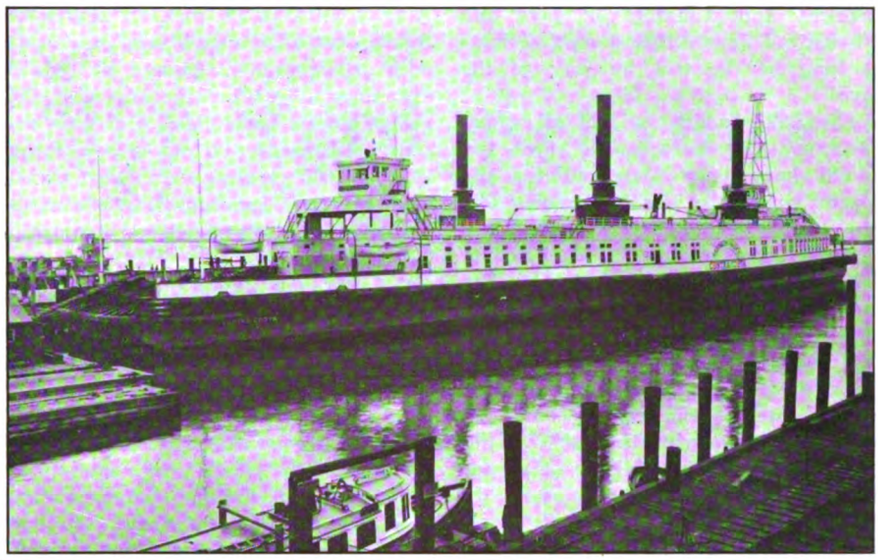
effecting a saving of $16.36 per day in favor of the diesel engine.

The advantages claimed for the diesel engine over steam engines may be summarized as follows: The thermal efficiency of the diesel engine reaches 41 per cent, while the best steam engine does not exceed 14 per cent. The diesel engine, therefore, produces the greatest amount of power from a given amount of fuel. Comparing steam engines using about 1½ to 1¾ pounds of coal per indicated horsepower-hour with diesel engines using ½ pound of oil per brake horsepower-hour, the cost of fuel per hour for the same brake horsepower will be less for the diesel engine, even if oil is 3½ to four times the price of coal. Diesel engines use only one-quarter as much fuel oil as a steam engine having boilers fired with oil. Fewer men are required to operate the diesel engine than the steam engine as the stokers and trimmers are dispensed with and there is an enormous saving in space, while stand-by expense is eliminated. As soon as the vessel stops the fuel consumption is also stopped.

The reliability of these engines is attested to by the fact that all submarines now being built by the United States navy are being equipped with heavy oil engines of the diesel type, manufactured by the New London Ship & Engine Co. The New London company manufactures engines with two, three, four and six cylinders from 60 to 360 horsepower inclusive, of the four-cycle type, and 6-cylinder engines of the two-cycle type ranging from 300 to 2,500 horsepower. The latter are single acting and reversible.



CAR FERRY OF SOUTHERN PACIFIC RAILROAD

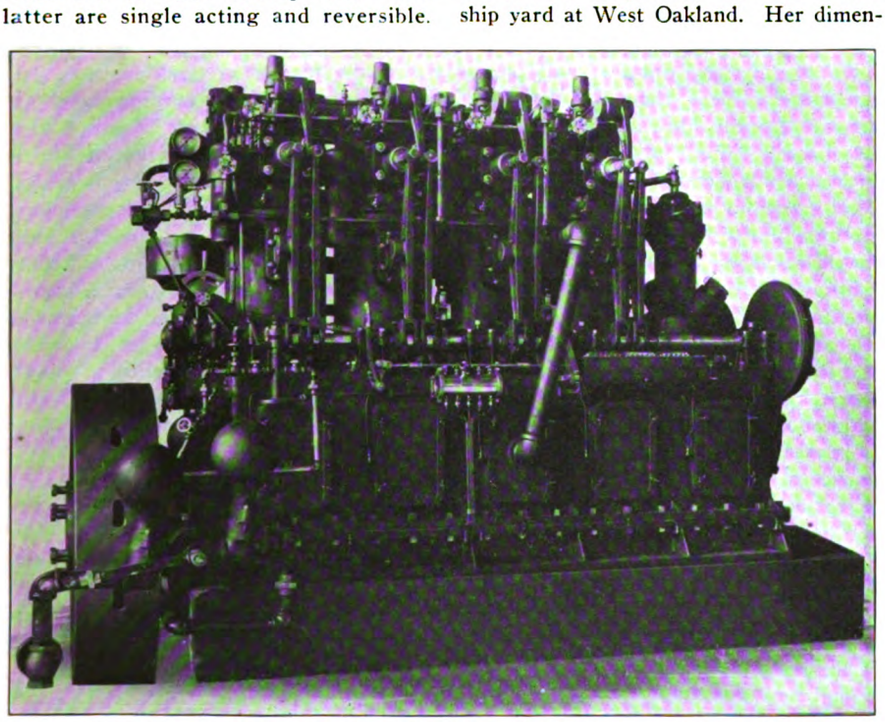
New Car Ferry

By A. A. Willoughby

CONTRA COSTA, said to be the largest car ferry in the world, is now in service transporting passenger and freight trains of the Southern Pacific railroad across Carquinez straits between Port Costa and Benicia, Cal. She replaces the car ferry SOLANO which had been in continuous service for 10 years with but one important interruption. The ferry operates on the main line for eastbound and northbound trains from San Francisco. CONTRA COSTA is shown in the accompanying illustration.

The ferry was constructed entirely by the Southern Pacific company, the machinery and boilers being built in the Sacramento shops and the hull in the ship yard at West Oakland. Her dimensions are: Length, 433 feet, 4 inches; length over guards, 420 feet; molded beam, 66 feet, 6 inches; molded depth, 19 feet, 5 inches; depth amidships, 19 feet, 9 inches. The hull and superstructure are wood. In the construction of the vessel, 2,000,000 feet of lumber, 30 tons of spikes, 76 tons of round iron and 16,000 trenails were utilized. Some of the timbers were 26 inches square by 66 feet long and 18 inches square by 116 feet long.

There are four engines, two sets being used for each paddle wheel. Each wheel is driven independently. Steam is generated in four oil-fired boilers of the Scotch dry-back type. Four tracks, each 420 feet long, run the length of the boat. They have a capacity of 36 freight cars and two engines or 24 passenger coaches and two engines.



STARBOARD SIDE OF 240-HORSEPOWER DIESEL ENGINE BUILT BY NEW LONDON SHIP & ENGINE CO.

Time Saved by Canal

Its approaching reopening makes the time which is saved by use of the Panama canal of renewed importance. In addition, the shorter route will greatly increase the effectiveness of fleets. Between the Atlantic and Pacific coasts of the United States, one vessel now can haul practically what two would have been needed for over the route around South America. The recent record set by PENNSYLVANIA clearly demonstrates this fact.

PENNSYLVANIA belongs to the American-Hawaiian fleet. Her time of transit from Philadelphia to San Francisco was 14 days, 17 hours and 25 minutes. Her average speed over the course of 5,130 nautical miles was about 14½ knots, or 348 miles a day. If PENNSYLVANIA had made the voyage from Philadelphia to San Francisco by way of the Straits of Magellan, a distance of 13,003 miles, at the same speed, the voyage would have

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required approximately 37 days and 8 hours. This is a little over 2½ times as long as the trip by way of the canal.

The 3,997 barrels of fuel oil which PENNSYLVANIA burned on the trip would have been increased for the longer voyage to 9,962½ barrels. The use of the canal saved accordingly about 5,965 barrels of oil. At 80 cents a barrel this amounts to $4,772. The canal tolls levied at $1.25 per ton on 4,064 net tons, United States registry, amounted to $5,070. In other words, the saving on fuel alone in this case, by the use of the canal, comes to within $300 of paying the tolls on the ship. The saving of all the other per diem expenses of operation, possibly $200 a day, for 22 days, represents almost clear saving to the operator.

Investigations of the Japanese department of communications, as reported in a dispatch from Tokyo, show that the total number of vessels with a displacement of 1,000 tons and upward that have been built in Japan with the government's subsidy since August, 1914, is 19, with an aggregate tonnage of 97,085; and that 39 vessels with an aggregate tonnage of 188,559 are now under construction with the government's subsidies. It was recently estimated that out of something like 490,000 tonnage in the transpacific service, available after the withdrawal of the Pacific Mail Steamship Co., 430,000 tons were Japanese, controled through government subsidies.

Opening of Russian Port Will Aid Shipping

The American-Russian Chamber of Commerce in New York announces the receipt of a cable communication from the Russian-American Chamber of Commerce in Moscow, stating that the port of Nikolaievsk, at the mouth of the Amur river in Siberia, will be opened for navigation on June 14 and will furnish a new method of placing goods on the Russian market. American exporters wishing to avoid the congestion and the delays in sending freight by way of Vladivostok should direct steamers to Nikolaievsk. Goods received at Nikolaievsk will be transported up the Amur river to Stretyinsk, which is reached by a railroad line connecting with the Trans-Siberian railroad. The cable states it will be possible to move 72,000,000 pounds of freight through the port of Nikolaievsk and by river traffic up the Amur river to Stretyinsk, which would be a great relief to the American shippers desirous of moving goods into Russia.

The opening of these new transportation facilities will be of particular value to the American exporters of cotton, metals, machinery, and tanning products. Shipments by way of Nikolaievsk on the Amur river will not be interfered with on account of government shipments. The opening of this port, therefore, furnishes an opportunity for exporters to avoid some of the delays heretofore encountered in moving goods into Russia. Further inquiries in regard to this matter should be directed to the American-Russian Chamber of Commerce, 60 Broadway, New York.

Use Semaphores at Livingstone Channel

IN ORDER to assist vessel masters in obeying the new rule which requires a time interval of not less than five minutes between downbound vessels navigating the Livingstone channel, two semaphore signals, installed by the U. S. lighthouse bureau, will be placed in operation at the opening of navigation, 1916; the upper one being located at Mamajuda rear light on the end of the light house dock, and the lower one being located at Livingstone channel pier light No. 9, which is on the west side of the north end of the cofferdam section.

East station has a lead-colored watch-house with red roof, and a white semaphore with an arm 8 feet long and 10 inches wide. At night the position of the arm is shown by two fixed white lights, one at the end of the arm and swinging with it, and the other stationary at the pivoting point. The Mamajuda semaphore is supported on a mast with the arm pivoting 20 feet above the base; its lights are visible from upstream only. The Livingstone channel semaphore is attached to the mast of pier light No. 9, so that the latter serves as the pivoting light.

The following directions pertaining to the operation of the semaphores have been formulated by Colonel Mason M. Patrick, the U. S. engineer officer in charge of Detroit river channels:

At each station the semaphore arm will occupy one of two positions, either held vertically or held horizontally. If the arm is vertical it will indicate "the way is clear" and that the required interval of at least five minutes obtains between boats passing down by the semaphore location. If the arm is horizontal it will mean that there is less than five minutes interval between downbound boats.

A vessel bound down, observing the Mamajuda semaphore in the horizontal position, must reduce its speed and run under check until the full time interval of five minutes between it and the preceding vessel has been gained. The distance from the Mamajuda semaphore to the red gas buoy No. 2 at the junction of Fighting island channel and Ballard reefs channel is about 1⅜ miles. After a vessel has passed down by the Mamajuda semaphore, the interval actually existing between it and a preceding boat may be estimated by noting the time which elapses after the vessel ahead makes the turn at this gas buoy until the vessel following arrives at the same place.

The distance from Fighting Island channel red gas buoy No. 2 to Ballard Reefs channel black gas buoy No. 81D, at the point where a vessel should turn into the Livingstone channel, is about 2¼ miles, and the full interval of five minutes must be gained by the time the vessel reaches buoy No. 81D. If the five-minute interval has been gained, the channel from buoy No. 81D to the Livingstone channel semaphore will be clear and the Livingstone channel semaphore will show in the vertical position. In this case the vessel may proceed at the regulation speed of 12 miles per hour. No vessel shall make the turn into Livingstone channel at buoy No. 81D until after a preceding vessel has passed the Livingstone channel semaphore, nor while the arm of that semaphore is in the horizontal position. The arm of the Livingstone channel semaphore will be lowered to a horizontal position when a vessel passes it and will ordinarily be held in that position for a period of one minute.

Six four-masted schooners will be built by R. L. Bean, Camden, Me., for foreign owners. In several Maine coast towns, ship yards which have been idle for years are now employed in repairing or turning out ships and several which are not now in operation are being hastily prepared to accept work for early delivery.

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American Ship Yard Activities

A Snappy Summary of the Leading Events of the Month in the Vessel Construction Field

Ship Building Goes On Apace

JUST as the overseas demand for munitions first engaged the attention of the largest and most favorably equipped factories of this country, and then rapidly overflowed their capacities, sending agents scouring the byways for every little shop which could muster up a lathe or two, so the call for ships has forced prospective owners to turn from the crowded yards of the Atlantic and Pacific coasts to those of the inland waterways. All the Great Lakes builders are booked for many months ahead and orders go a-begging. The outstanding feature of construction activity in the past few weeks has been the revamping of old and decrepit ship yards into something capable of turning out ocean-going tonnage. Nor are buyers over particular to a point of nicety. In cases where steel construction is not to be had—and there are many—wood has been accepted with good grace; a recent instance being afforded by a Pacific coast yard which has experienced a renaissance in its long-decayed business of building wooden schooners. An element of speculation has, it is said, been present to some degree in the organization of large ship building concerns; but the fact that money is plentiful and demand unceasing, minimizes this factor. "We are today experiencing a demand for steamers coincident with the growing movement for the revival of an American merchant marine," said a well-known shipping man recently. "Steamers are being built for interests which are paying prices that are almost double those before the war. These tonnage prices are being paid on the prospect that the war will be one of long duration. Thus, steamers completed early in 1917 will be enabled to earn a large part of their increased cost by partaking in the high ocean freight rates that are now obtainable and will probable continue to prevail until long after the conclusion of hostilities.

"Should, however, the war come to an unlooked-for end, a conclusion of startling suddenness, another problem with respect to the value now placed on ocean tonnage would arise. Can an owner of a steamer costing $400,000 compete with the owner of a steamer costing only $250,000, each vessel being of the same earning capacity? The solution of this matter would rest entirely with the prospect that the demand for freight room would continue in excess of the supply. This is entirely problematical."

* * *

EVIDENCE of the revival of ship building in Maine, as a result of the prevailing high rates for ocean freight-carrying due to the war, is indicated by the announcement that six four-masted schooners will be built by R. L. Bean, Camden, under a contract recently signed. It is said that the total cost of these vessels will be $800,000. The contracts call for six four-masted schooners, five of which will have a carrying capacity of 2,000 tons each, while the sixth will carry about half that cargo. The schooners of the larger type will have the following general dimensions: Length, 205 feet; beam, 40 feet; depth, 19 feet. Each will be equipped with an engine of 360 horsepower. Ready for sea, each vessel will represent a cost of more than $150,000. The smaller type four-master will have a

Steel Merchant Vessels Building or Under Contract March 1

THIS TABLE SHOWS THE TONNAGE BUILDING OR ORDERED ON FEB. 1, LESS TONNAGE COMPLETED IN FEBRUARY, NEW TONNAGE ORDERED IN FEBRUARY, AND THE TOTAL FOR MAR. 1

Name of Builder.	Merchant tonnage Feb. 1, 1916, less completions. No	Tons.	New contracts closed Feb., 1916. No.	Tons.	Merchant construction, Mar. 1, 1916. No.	Tons.
American Bridge Co., Ambridge, Pa....	16	10,388	.	.....	16	10,388
American Ship Bldg. Co., Cleveland, O..	14	63,300	4	8,100	18	71,400
Baltimore Dry Docks & Ship Building Co., Baltimore, Md.....	7	24,500	.	.....	7	24,500
Bath Iron Works, Bath, Me.....	5	1,900	.	.....	5	1,900
Charles Barnes Co., Cincinnati, O.....	1	300	.	.....	1	300
Chester Ship Building Co., Chester, Pa..	7	34,000	.	.....	7	34,000
Clinton Ship Bldg. & Repair Co., Philadelphia, Pa.	2	560	.	.....	2	560
Cowles Shipyard Co., Buffalo, N. Y....	1	20	1	36	2	56
Dubuque Boat & Boiler Wks., Dubuque, Iowa	1	25	.	.....	1	25
Ellicott Mch. Corp., Baltimore, Md.....	3	750	.	.....	3	750
Fore River Ship Bldg. Corp., Quincy, Mass.	12	60,000	.	.....	12	60,000
Great Lakes Engrg. Wks., Detroit, Mich.	15	58,880	3	7,400	18	66,280
Harlan & Hollingsworth Corporation, Wilmington, Del.	13	57,776	.	.....	13	57,776
Herreshoff Mfg. Co., Bristol, R. I.....	1	178	.	.....	1	178
Howard Shipyards Co., Jeffersonville, Ind.	7	4,600	.	.....	7	4,600
James Rees & Sons Co., Pittsburgh, Pa.	1	.....	.	.....	1	.....
Manitowoc Ship Building & Dry Dock Co., Manitowoc, Wis.....	4	1,000	.	.....	4	1,000
Maryland Steel Co., Sparrows Point, Md.	12	65,500	.	.....	12	55,500
Milwaukee Bridge Co., Milwaukee, Wis.	1	.....	.	.....	1	.....
Moore & Scott Iron Wks., Oakland, Cal.	3	10,000	.	.....	3	10,000
Newport News Ship Building & Dry Dock Co., Newport News, Va.....	16	113,921	.	.....	16	113,921
New York Ship Bldg. Co., Camden, N. J.	22	115,773	.	.....	22	115,773
Pusey & Jones Co., Wilmington, Del....	6	1,684	.	.....	6	1,684
Quintard Iron Wks., New York, N. Y..	1	900	.	.....	1	900
Seattle Construction & Dry Dock Co., Seattle, Wash.	5	19,800	1	8,000	6	27,800
Spedden Ship Bldg. Co., Baltimore, Md.	3	730	.	.....	3	730
Stand. Ship Bldg. Corp., New York.....	.	.....	3	14,400	3	14,400
Staten Island Ship Building Co., Port Richmond, N. Y.....	5	1,519	2	4,400	7	5,919
Tampa Mach. & Fdy. Co., Tampa, Fla..	1	2,000	.	.....	1	2,000
Toledo Ship Bldg. Co., Toledo, O.....	7	17,900	4	7,200	11	25,100
Union Iron Works, San Francisco, Cal.	20	144,158	.	.....	20	144,158
Wm. Cramp & Sons Ship & Engine Building Co., Philadelphia, Pa.....	12	72,600	2	11,600	14	84,200
Total	224	884,662	20	61,136	244	945,798

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carrying capacity of about 900 tons. Her dimensions will be: Length, 160 feet; beam, 35 feet; depth, 13 feet.

In a number of Maine coast towns, ship yards that have been idle for years are now being worked or made ready for new construction. At Machias, agents of a New York concern have bought a tract of land on the harbor front and will build a number of large schooners. Several schooners will be built at Rockland, one at Rockport and two or more at Milbridge, while at Bath a considerable resumption of building has taken place.

* * *

OFFICIALS of the larger Seattle ship building plants recently estimated that vessels of various types valued at $8,258,000, either are under way or have been contracted for at Seattle yards.

Work on 10 steel vessels costing $6,700,000 has been started at the plant of the Seattle Construction & Dry Dock Co. The fleet includes three submarines for the United States navy, a torpedo boat destroyer, two steel freighters for the Ward line, costing $600,000 each; three steel freight steamers for Norwegian interests, represented by A. O. Anderson & Co., which will cost $2,000,000, and a steel cargo steamer for the Luckenbach Steamship Co., of New York, representing an expenditure of $1,000,000.

The Skinner-Eddy Corporation, a ship building plant on the east waterway, has completed plans for four steel steamers, which will cost approximately $1,200,000. The company is incorporated for $300,000. It is expected the first vessel will be ready for delivery by next December. At the Anderson ship building yards on the east waterway, the United States steel lighthouse tender ROSE, which will cost $110,000, is nearing completion. J. F. Duthie & Co. have begun work on the new Elliott bay ferry for the Seattle port commission. This vessel will represent an expenditure of approximately $30,000. Nilson & Kelez are completing a twin screw freighter of 300 tons for the Nelson-Lagoon Packing Co., a subsidiary of the Pacific American Fisheries, which will cost $25,000. At the yards of Johnson Bros. & Blanchard, a twin screw tunnel stern freighter for the Westward Navigation Co., a newly organized corporation, is building. The vessel will be 150 feet long and 35 feet beam, and will cost when completed and fully equipped approximately $70,000. This firm is also building many lifeboats for steamers under construction at the various plants. Edward Heath is building a large power schooner for Capt. Louis Lane and John Borden, of Chicago, at Port Blakeley, which will cost approximately $75,000. The vessel is to be used in cruising in the Arctic and will be ready to sail from Seattle by June 1.

* * *

CHRISTOFFER HANNEVIG, Christiana, Norway, has purchased a majority of the stock of the Pusey & Jones Co., Wilmington, Del., thus acquiring control of this firm. He is a member of Hannevig & Johnson, New York ship brokers, and recently has contracted for a large number of ships in this country. It is his intention to improve the ship building facilities of the Wilmington plant and to engage in the building of vessels upon a more extensive scale than heretofore. The plant will be operated by the same officers and organization as before. The yard will build standardized ships, turning out a large number of the same size, build and type, selling them as fast as they can turn them out. In this manner it is hoped to effect a tremendous saving in cost, as one set of plans will do for all the ships, and large quantities of plates and shapes can be bought or manufactured at the yards and stored away until wanted. American ship builders have until the present time frowned upon the standardization idea, preferring to turn out each ship to special order. The method has been a great success in England, however, where standard cargo boats have been turned out for as low as $35 a ton.

Six ships of 6,000 tons each will be built at the yard of the Pennsylvania Ship Building Co., Gloucester, N. J., as soon as the company is able to erect the necessary buildings and get things going. Four hundred and fifty men will be employed. Two 5,000-ton tankers and a 4,000-ton freighter are under construction at the Chester Ship Building Co.'s yard at Chester, Pa. Twenty-five ships are building at the New York Ship Building Co. plant, at Gloucester, 18 at Cramps and 14 at Harlan & Hollingsworth's.

* * *

THE Huaspeca Petroleum Co., New York, has ordered a huge tank steamer of 10,000 tons from the Moore & Scott Iron Works, Oakland, Cal. The vessel will be 450 feet long and will represent an expenditure of $1,250,000. She will be built according to the Isherwood system.

With two contracts already signed for 7,200-ton steel steamers for George W. McNear & Co. and the Rolph Coal & Navigation Co., the yard now has enough work on hand to keep it running to capacity for many months. Golden Gate shipping men are of the opinion that the order for this vessel, which will be almost as large as the Union Oil Co.'s new tankers, LA BREA and LOS ANGELES, built by the Union Iron Works, is the forerunner of other big contracts which will soon be placed on the west coast by eastern concerns. The new oil tanker is to be equipped with 2,600 horsepower Curtiss turbine engines capable of propelling the vessel at a top speed of 12 knots.

Joseph Moore, brother of the senior partner of the company, has been appointed to the position of general manager of the company's plant in Oakland, a post formerly held by J. T. Scott.

* * *

MOST of the ship building yards in Sweden have enough work on hand to keep them busy until the end of 1917. As most of the vessels are for Swedish firms and as Norwegian and Danish ship builders are also building for Swedish firms, it is evident that the merchant marine of the country will be greatly increased in the near future. The Swedish ship building industry is developing considerably, and different yards are specializing in different branches of work. Bergsunds Verkstads-aktiebolag is specializing on smaller vessels, especially those run by power. This company is supplying Russia with power boats to take the place of other vessels used on the rivers. In addition the company has orders for one ice breaker and one combined tugboat and ice breaker. The present orders will keep it busy for 18 months.

Motala Verkstaden also has many orders on hand. It specialty is tugboats, a combined tug and ice breaker in particular, furnished with a 500-horsepower engine. The director of Gotaverken in Goteborg states that the establishment has work to keep it busy until some time in 1918. Some of the vessels under construction, besides warships, are two steamers of 9,000 and 10,000 tons for the Transatlantic Steamship Co., and 8,000-ton vessel for the Viking Steamship Co. Eriksbergs Mekaniska Verstads Aktiebolag has work until the middle of 1917. At present it is specializing in 900 and 1,800-ton vessels, but after the works has been enlarged it intends to specialize in larger vessels. Lindholmens Verkstads-aktiebolag has enough work until the summer of 1918. It is building a 6,500-ton vessel for the Nord Steamship Co., Stockholm, and has received orders for

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eight 3,200-ton vessels of the special type made by this company.

* * *

THE first of several 12,000-ton ore freighters being built for the Interlake Steamship Co. by the American Ship Building Co., Cleveland, was launched recently at the Lorain yard of the ship building company, and was christened HENRY G. DALTON, after the president of the steamship company. She is of Isherwood construction and is 600 feet in length over all, with a beam of 60 feet and a depth of 32 feet. She is being equipped with three Scotch boilers. The vessel is the second to be named after Mr. Dalton. A 600-foot freighter for the Pittsburgh Steamship Co. will be launched at the American Ship Building Co.'s Lorain yards shortly.

A contract has been placed by the Pennsylvania Steel Co. with its subsidiary, the Maryland Steel Co., for the construction at Sparrows Point, Md., of a third 15,000-ton iron ore carrier. Several months ago an order was placed by the Pennsylvania Steel Co. with the Sparrows Point yard for the building of two vessels of similar type, which are to be employed by the former in bringing iron ore from its mines on the north and south coasts of Cuba. At present the company owns no boats but has been shipping its Cuban ore in vessels chartered in the open market.

The steamship CHARLES PRATT, built for the Standard Oil Co., was recently launched from the ship yard of the Newport News Ship Building & Dry Dock Co. She is the first of five similar oil tank steamers building by the Newport News Co. for the Standard Oil Co.

S. C. Loveland recently contracted with Perry & Small, ship builders of Maine, for the construction of a schooner to be adapted for the coast trade, to have a carrying capacity of 1,300 tons of cargo. She will be named CHARLES D. LOVELAND.

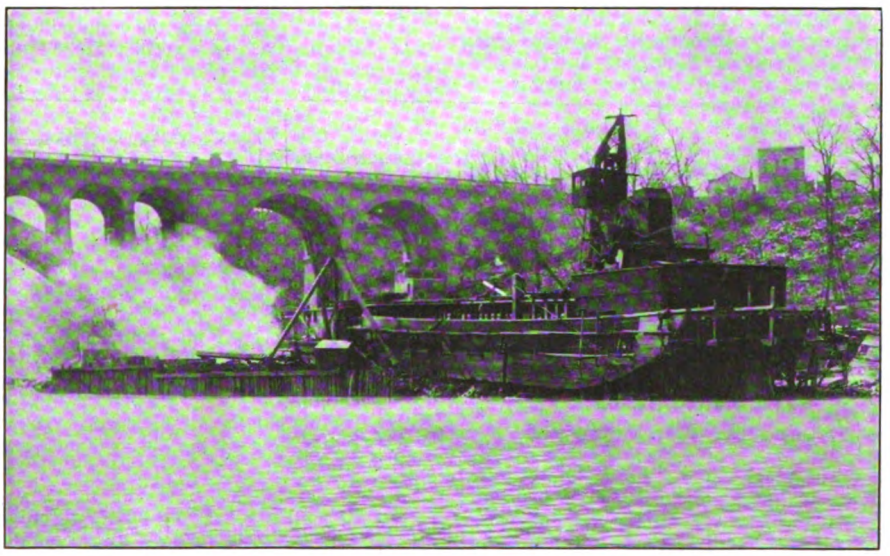
It is reported that the old Crescent ship yards of the Samuel L. Moore & Sons Corporation, Elizabethport, N. J., are to be overhauled and arrangements made for the building of steamers up to 300 feet in length.

Captain Gowan, of Liverpool, has arrived in New York to take up duties as the superintendent for the steamship services of Furness, Withy & Co., Ltd., in the United States.

Enlarges Lake Ship Yard

Rocky River Dry Dock Co. Increases Facilities—Installs Marine Railway

THE plant of the Rocky River Dry Dock Co., Rocky River, O., which has been used for building, rebuilding and repairing yachts, tugs, dredges and scows, has been enlarged and a 500-foot marine railway constructed. The company is now equipped to handle vessels up to 200 feet in length with 12-foot draught and plans to build, rebuild and repair still larger lake-going vessels. The main shop is well equipped for this purpose. The machine and blacksmith shops are fitted with modern appliances and a 10-ton electric derrick has been placed in service. Seventy-five men are employed all during the year.



FUEL LIGHTER AT ROCKY RIVER DRY DOCK CO. YARD

The plant is located about one-eighth of a mile from Lake Erie on Rocky river and covers seven acres. An advantage claimed by the company for its marine railway over a dry dock, is the facility with which craft can be hauled in, pushed to one side and another taken in, until all available space has been used.

The accompanying photograph shows the fuel lighter WILLIAM G. PERRY, of the Pittsburgh Coal Co., being rebuilt while resting on the marine railway.

The officers of the company are: Captain N. Simonson, president; C. E. Klye, secretary and treasurer; T. L. Zickes, manager.

The new United States naval collier MAUMEE, recently built at the Mare Island navy yard, San Francisco, has reached New York in tow of the naval repair ship PROMETHEUS. She has been docked at the New York navy yard, where she is to be fitted with her engines.

Sails for Bering Sea

After an extensive overhauling and repairing at the plant of the Seattle Construction & Drydock Co., Seattle, the power schooner RUBY inaugurated the 1916 Bering Sea season, when, as the first of the Bering Sea fleet, she sailed for the north with a cargo of material for a new cannery near Port Moller, Bristol Bay. RUBY is under charter for the northern voyage to the recently organized Bering Sea Packing Co. Capt. Louis Knaflich, one of Seattle's leading arctic navigators, is in command of RUBY. At the plant of the dry dock company RUBY was equipped with a keel in place of the twin centerboards which had made her notable along the coast. She made an early voyage into Bering Sea last year, sailing March 1, and experienced no difficulty with weather conditions.

The Howaldts Ship Building Works, of Kiel, Germany, has just issued its accounts for the business year ending Sept. 30, last, which show a net profit of 262,307 marks.

A large new ship building company has been formed at Linhamn, Shoonen, in Sweden, to include workshops, ship building yard and extensive offices, according to recent advices.

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On the Coasts, Lakes and Rivers

What's Doing and Who's Doing It

Open Chicago-New Orleans River Service

By H. H. Dunn

THE Chicago-Gulf Transportation Co., reported to be capitalized at $10,000,000, has taken over the steamer STEEL CITY, renamed it COLONEL CONWAY, and inaugurated through passenger and freight transportation by water between Chicago and New Orleans. The company is said to be backed by prominent business men and shippers of Chicago, and the installation of the steamer line is reported to be their answer to New York in connection with rail freight rates on export shipments. Colonel Conway, for whom the steamer was renamed, inspected the boat and conferred with her captain, Edward Noland Jr., recently in New Orleans. Colonel Conway announced that the company will put two other steamers—one from St. Louis to New Orleans and one between Memphis and New Orleans—into service soon. W. A. Bertman is manager of the company. COLONEL CONWAY, after leaving New Orleans for its northern terminus at La Salle, Ill., left that city on her return trip March 25, and New Orleans again on April 3, trips being made regularly every three weeks thereafter. The Chicago-Gulf Transportation Co. plans eventually an all-water line from Canadian ports on the Great Lakes to New Orleans.

* * *

More steamers came down the river with large parties of Mardi Gras carnival visitors than in any of the past five or six years. HOMER SMITH and ST. JAMES came down from Pittsburgh; PEORIA from St. Louis; STEEL CITY (now COLONEL CONWAY) from the Illinois river, and G. W. ROBERTSON from Baton Rouge.

* * *

The steamer ST. JAMES, for many years a New Orleans packet, has been sold by Captain John E. Klein, of Pittsburgh, to Captain H. M. Lindsey, of Mobile, Ala. She has left New Orleans for the latter port, where she will be operated as a packet on the Warrior and Tombigbee rivers.

* * *

The Wheeler Towboat Co. has been organized at Jonesville, La., to handle the products of the Tarve M. Wheeler Lumber Co. intended for river shipment. The towboat company has purchased the steamer T. R. TAGGART, at Vicksburg, Miss.; four barges and a derrick boat. It will begin operations immediately.

* * *

The Bluefields Fruit & Steamship Co., New Orleans, has purchased the 1,600-ton steamer PORTO RICO from the Baltimore & New York Steamship Co. Victor Camors, president of the Bluefields company, acted as purchasing agent in the deal. This is the first American vessel bought for foreign service by a New Orleans company. PORTO RICO will be operated between the Crescent City, Bluefields and Cape Gracias.

* * *

The Slidell Dry Dock & Shipbuilding Co., Slidell, La., is making large improvements to its plant. The company soon will be in a position to handle deep-sea vessels on its ways, as well as to build the largest boats required in southern waters. Dredging of a deeper channel through the center of the lake makes it possible to bring sea-going ships directly to the company's yards.

* * *

John G. Oriol, who for several years, has conducted the American business of Jose Taya's Sons, of Barcelona, big ship-owners, severed his connection with the firm, March 1, and will enter the export business for himself. The New Orleans office for the present is under direct management of Ricardo Taya, while Pablo Ferres has been appointed port captain.

* * *

For the purpose of building a number of schooners to engage in trade along the Atlantic coast, the Brunswick Shipbuilding Co. has been formed at Savannah, Ga., under the direction of Captain J. H. Leo. The company is incorporated for $50,000, with privilege of raising the capital stock to $500,000. Sixty business men of Savannah headed the petition for charter.

* * *

High rates prevailing for shipments to England are well illustrated by the recent charter of a schooner at Gulfport, to carry lumber to Great Britain at $60 per thousand, about eight times the rate before the war. She will carry 1,300,000 feet and will earn $78,000 on the trip.

* * *

The Alabama Coal Transportation Co. has been incorporated under the laws of Louisiana, according to announcement by H. C. Whiteman, of Whiteman Brothers, of New Orleans. The corporation, capitalized at $500,000, has been formed to operate steamboats, towboats and barges from and to the Warrior river coal districts of Alabama. The company will have about 70 vessels, including tugs, sea-going barges, and steamers. Practically all the stock is subscribed and operations are scheduled to start May 1. Coal is to be handled to all gulf ports of the United States and to Cuba and Central America, from Alabama, and return cargoes of lumber and merchandise brought in. According to Mr. Whiteman, the cost of coal to the consumer in New Orleans will be materially lowered by the operation of the new boat line.

* * *

As a direct result of the opening, cleaning out, deepening and putting in of locks on the Warrior river, Alabama, the Henderson Lumber Co. is preparing to erect a mill of 100,000 feet capacity near Holt, on the bank of the improved island waterway.

* * *

The United States Steel Corporation is preparing to install self-propelled steel barges from the Birmingham district via the Warrior river, the Gulf, Mississippi sound and other inland waterways, to New Orleans and Texas points. These barges will carry steel products. It is reported that the Steel Corporation will take over the barges now being operated in that section by the Alabama & New Orleans Transportation Co., but this could not be confirmed at the offices of the latter corporation in New Orleans.

* * *

Captain J. M. Scott has bought the barkentine JOHN PALMER in New York, for $50,000, and will add it to the Scott fleet, operating out of Mobile, Ala. The barkentine will bring a cargo of coal to Mobile and will then load lumber for the west coast of Italy.

* * *

The Whitney-Bolden Co.'s barkentine STRANGER, operating out of Mobile, Ala., claims the record for a round trip from a gulf port to Tampico, Mexico. She went from Sabine, Texas, to Tampico, unloaded 13,000 feet of lumber and returned to Sabine in 21 days.

* * *

The making of cordage for shippers and rigging for sailing vessels from the fibre of the hitherto waste palmetto, which covers the swamps of the south, has been begun by the Palmetto Products Co., Jacksonville, Fla.

* * *

Scarcity of ocean-goin vessels has caused a serious falling off in exports from Gulfport, especially in lumber shipments.

* * *

Mato Skifich, a naturalized Austrian, for 10 years widely and well known along the Mississippi river, and for four years engineer of the big trade power boat GEM, plying between New Orleans and Empire, on the lower coast, fell overboard and was drowned near the mouth of Duluth's canal a few weeks ago. The body was not recovered.

* * *

Captain James Rudden, of the American steamer MARY OLSON, has been accused of criminal neglect of duty and neglect of his crew by the entire crew, before U. S. Shipping Commis-

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sioner James P. Baumann, at New Orleans. MARY OLSON is operated in the New Orleans-Nicaragua trade by the Olson Mahogany Steamship Co., San Francisco. The crew's charges include inadequate food, lack of ice, failure to buy fresh rations at Bluefields, Nicaragua, and refusal to send up distress signals when drifting on the gulf, through the captain's alleged failure to carry oil enough to operate the engines. Captain Rudden denied all the charges, and Commissioner Baumann took the case under advisement.

Boston Bay Doings

By George S. Hudson

A NUMBER of steam trawlers have been ordered by the Bay State Fishing Co. in addition to the nine steamers now operated by this Boston company. The contract for the steamers may be placed on the lakes where promise of delivery at a reasonable date is assured. The Gorton-Pew Fisheries Co., Gloucester, Mass., also contemplates building several trawling steamers, the contract to be awarded near Boston, if possible. Of late the demand for tonnage has resulted in sale of a number of fishing schooners to Newfoundland interests, these vessels to engage in trade with England and the West Indies.

* * *

Early this month the excursion steamer MARY CHILTON, built for the Nantasket Beach Steamboat Co., by the McKie Shipbuilding Co., East Boston, was launched in presence of a large party. The vessel will be placed on the Boston harbor run about July 1 with Capt. E. E. McFarland in command. CHILTON is of wood construction, 215 feet long and has accommodation for 2,500 persons. Miss Betty L. Barnes, daughter of C. B. Barnes, a director in the steamboat company, was sponsor.

* * *

A full cargo of burlap was shipped from Boston to Galveston about April 10 in the steamer EL MONTE which was placed at disposal of shippers by the Southern Pacific line on account of urgent needs of cotton balers. It is the first time that a cargo of that nature has been taken from Boston by steamer.

* * *

The four-masted schooner JEROME JONES was launched from the Gardner G. Deering yard at Bath, Me., March 31, and will load a cargo of coal for Buenos Aires at a Chesapeake Bay port, the rate being $20 per ton. The schooner is commanded by Captain E. L. Nash.

* * *

Steamers of the Leyland line, between Liverpool and Boston, have discontinued carrying horses to English ports. Since outbreak of the war about 40,000 horses have been shipped to England and France.

* * *

Capt. C. W. Pickthorn, of the British steamship CLEARWAY, from Calcutta, dropped dead on the freighter's bridge while entering Boston harbor. The ship was brought to a berth by Chief Officer Emlyn Jones. Captain Pickthorn was buried at Boston. He leaves a family in Liverpool. The ship cleared in charge of the chief officer.

* * *

The three-masted schooner ANNE LORD, recently abandoned while bound from Halifax, N. S., for New York with a cargo of lumber, has been repaired at the Richard T. Green yard, Chelsea, Mass. The lumber was disposed of at Boston.

* * *

The four-masted schooner MAY V. NEVILLE has had her name changed to FRED W. THURLOW and is bound from Boston to Sekondi, W. C. A., with a cargo of rum and flour. Capt. F. H. Allen, formerly in the schooner ROBERT GRAHAM DUN, commands THURLOW, which is owned by Crowell & Thurlow of Boston.

* * *

The new tanker TEXAS, built by the Fore River Shipbuilding Co., Quincy, Mass., has been delivered to the Texas Oil Co. at New York. The ship has tank capacity for 8,000 tons of oil. Two other vessels for the same company are under construction at the Quincy yard.

* * *

The coast guard cutter GRESHAM, Capt. Camden, found and towed to Boston the three-masted schooner ANNE LORD, which Capt. Merriam and his crew abandoned not long ago in Cape Cod waters. The vessel is undergoing repairs and will resume her passage from St. John, N. B., for Bridgeport, Conn.

* * *

Capt. B. E. Scott and crew of the three-masted schooner HORATIO were rescued and brought to Boston by the fishing schooner LOUISE R. SYLVA, Capt. Muise, when it became necessary recently, to abandon the waterlogged craft off Cape Ann. HORATIO was bound from Shelburne, N. S., for Bridgeport, Conn., with a cargo of lumber, being subsequently picked up and towed to Boston by the coast guard cutter OSSIPEE, Lieut. Ridgley.

Around Chesapeake Bay

By Hollis F. Bennett

A DELEGATION of prominent business men of Baltimore, representing the Manufacturers Association, has been in Washington before the interstate commerce commission protesting against the discontinuance of the bay steamer lines of the Baltimore, Chesapeake & Atlantic and the Maryland, Delaware & Virginia Railway companies on the eastern shore of the bay. According to a ruling of the commission under the Panama canal act, which forbids railroads from owning and operating competing water lines, the railroads had until April 1, to dispose of the Choptank, Nanticoke, Wicomic, Tred Avon, and Pocomoke, Crisfield and Onancock lines. Up until the present the lines have not been sold, the railroads planning to abide by the commission's ruling and discontinue the service on April 1, together with three lines on the western shore of the bay which reach the Potomac, Patuxent, Piankatank, Rappahannock and Great Wicomic rivers. The two companies which are controled by the Pennsylvania railroad operate a fleet of about 30 steamers on these routes which serve about 88 wharves on the different rivers.

* * *

The steamship KANAWHA which was lost recently in a gale off Cape Hatteras, had been overhauled at the plant of the Baltimore Dry Dock & Shipbuilding Co. and had been fitted with new masts and deck winches. The owners had also asked tenders on reboilering the ship.

* * *

The big sidewheel excursion steamer DREAMLAND is at the yard of the Baltimore Dry Dock & Shipbuilding Co. getting a new port shaft. DREAMLAND was built by the Harlan & Hollingsworth Co. at Wilmington, Del., and is one of the largest sidewheel excursion steamers in the country. She ran for many years between Philadelphia and Cape May, making a round trip per day. She has a beam engine 60 inches diameter and 12 feet stroke and made 20 miles per hour on her trial trip.

* * *

The Spedden ship building plant is at Baltimore recently reports she picked up the Danish steamship RIBE of Copenhagen, on March 12, short of fuel and took her in tow. Due to adverse weather conditions and shortage of fuel PONTWEN was forced to drop his tow and proceed on his voyage. RIBE has a crew of 35 men aboard.

* * *

The Maryland Steel Co. launched the steamer MARGARET for the A. H. Bull Co. on March 20. MARGARET was christened by Miss Margaret I. Cook, the granddaughter of the secretary of the steamship company. MARGARET is a single deck freight steamship built under the Isherwood system. She is 340 feet long over all, 328½ feet between perpendiculars, 46 feet beam, 25½ feet depth and has a cargo capacity of 5,000 tons. After the launching an informal luncheon was served to the launching party at the Sparrows Point Club.

* * *

The Spedden ship building plant is rushed with work at its yards at Canton, Baltimore. It is building a new tug for the Northern Transportation Co. 160 feet long and 1,100 horsepower and has another tug 125 feet long for the same company. The hull of the B. C. & A. railroad company's steamer MARYLAND which burned off Mountain Bar Point last fall is being converted into a barge, also for the Northern Transportation Co. New boilers are being built for the Maryland Dredging Co.'s tug SARAH, the Atlantic Coast Line's tug NEPTUNE, the Atlantic Transportation Co.'s tug MARY P. RIEHL, the steamer FAVORITE of St. Petersburg,

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Fla., and the municipal ferryboat S. W. SMITH.

* * *

Four big American sailing vessels, the five-masted schooner DOROTHY B. BARRETT, coal laden for Buenos Aires, the five-masted schooner MARCUS S. URANN, coal laden for Havana, the schooner WILLIAM P. HOOD and the bark JOHN C. MEYER, coal laden for Pernambuco, are held in Norfolk on account of not being able to get sufficient seamen to fulfill the requirements of the La Follette seaman's act. The masters of the vessels have applied to the department of commerce for relief.

In New York Harbor

By Wilbur Martin

LAST year was the first during the 10 years the New York municipal ferries have been in operation that the results showed a surplus of revenues over expenditures, according to a recent report of Commissioner of Docks and Ferries Smith to Mayor Mitchel. An operating surplus of $135,334 was recorded by the boats running from Manhattan to St. George, Staten Island, and to Thirty-ninth street, Brooklyn, despite a net decrease in the gross earnings of $23,000. Gross receipts of the St. George ferry were $846,615, against $854,866 in 1914, and operating expenses $693,893, compared with $839,263. On the Thirty-ninth street line the gross receipts were $207,514, against $222,201 and operating expenses $224,901, compared with $369,938. No account was taken of interest on investment or depreciation of property which would be charged against earnings by a private corporation. Had these items been taken into consideration and a fair sum charged, the deficit in 1915 would have been $480,000, compared with $747,550 in 1914.

* * *

The Lehigh Valley railroad has notified the interstate commerce commission that its new freight station, to be know as Hudson river pier 8, at the foot of Rector street, is ready for business. The new pier, erected at a cost exceeding $1,000,000, is the latest word in modern pier construction. It is 730 feet long by 75 feet wide, with water rights on both sides. The structure is absolutely fireproof throughout.

* * *

Simpson, Spence & Young, New York steamship agents, have removed from the offices which they have occupied for 18 years on the fourth floor of the Bowling Green building, 11 Broadway, to the eighth floor of the same building. Their new offices embrace one-half of the entire floor on the river side. The suite includes a captain's room, as well as a special room for guests.

* * *

The steamer GUISEPPI VERDI, of the Transatlantica Italiana, recently sailed from Genoa and Palermo for New York carrying the largest number of passengers to leave Italy in some time. There were 239 cabin passengers and 1,230 in the steerage.

* * *

The Brazilian steamer TROPEIRO arrived in New York recently from Gloucester, Mass., one of her ports of call to go into dry dock. She has recently been purchased by a British company and will be refitted and renamed EDITH CAVELL. Another British steamer named EDITH CAVELL, formerly WAGNER, left Cadiz recently for New York.

* * *

Captain Jacob Reichert, president of the Reichert Towing Line, New York, advocates the collection by towing companies from the city of an amount equivalent to the time lost by tugs in trying to find a hydrant that is in working order. Frequently several hours are lost in the process of obtaining a supply of water, because the hydrants are not operating properly. Ordinarily this would not mean so much, but with time value at about $10 an hour, the loss is considerable.

* * *

Railroad embargoes are more stringent, if anything, now than for some time past, according to Theodore B. Johnson, of the Johnson Lighterage Co. Freight, he says, will only be received with the understanding that it will be removed immediately by the consignee upon its arrival at New York terminals. The lighterage interests are considerably hampered by these regulations.

* * *

Thomas J. Howard, 1 Broadway, New York, has placed his new wrecking steamer, MICHAEL HOWARD, in commission. This makes three vessels of this character now operated in this work by Mr. Howard.

Along Puget Sound Shores

By F. K. Haskell

FACING a dilemma in not obtaining sailors as a consequence of the stringent provisions of the new seaman's law, which prevents advances being paid to sailors on foreign as well as American vessels, also allotments of any kind save for the benefit of relatives, thereby eliminating the customary source of revenue for those supplying sailors, the Portland chamber of commerce has appealed to Secretary Redfield, of the department of commerce, for temporary relief from the law.

* * *

The J. A. McEachren Co., Ltd., general contractor of Seattle has purchased 1,200 feet of waterfront on Youngs river near Astoria, Ore., and will immediately begin the construction and equipment of a ship building yard.

* * *

Capt. E. L. McNoble resigned as superintendent of the Pacific Coast Steamship Co., effective May 1. Capt. McNoble has been engaged in the steamship business 26 years.

* * *

The steamer CURACAO, which was wrecked off the west coast of Prince of Wales Island in 1913, has been repaired in Seattle and will shortly re-enter the Southeastern Alaska trade. CURACAO lay in 78 feet of water for more than a year as a hopeless wreck. She was abandoned by the Pacific Coast Steamship Co., to the underwriters who sold her to the Alaska Wrecking & Salvage Co., headed by Capt. Harry W. Crosby and associates. This company performed a remarkable salvage feat in raising the vessel and sold her back to her former owners, who have now fitted her up for service, under the command of Capt. Frank Landstrom.

* * *

The American barkentine JANE L. STANFORD was libeled for $20,000 in the federal court at Tacoma by the Puget Sound Tug Boat Co. The complaint sets forth that on Jan. 9, while STANFORD was being towed to Port Townsend in ballast by the tug PROSPER she was struck by a gale in the Straits of Juan de Fuca. It is alleged that the master of the barkentine refused to cast his hawser and the vessel was driven high on the Port Angeles spit. Negligence is charged and upon this ground, as well as for assistance rendered, damages are asked.

* * *

Alfred Holt & Co., Liverpool, have presented a beautiful silver loving cup to the officers of the United States lifesaving tug SNOHOMISH in appreciation of the aid extended to the Blue Funnel liner CALCHAS, when she was ashore at Point Wilson last October.

* * *

In spite of the unusual charter inducements and fabulous prices offered for vessels of the Puget Sound-Alaska fleet, the new Alaska season will open with the greatest fleet of merchant vessels in the history of the trade on hand to care for the spring and summer trade. The present season will see a tremendous business between the Sound and Alaska ports, for activities in the north will be greater than ever before. The northern canneries have increased in number and will require a greater amount of freight, while the new government railroad work at Anchorage means an immense amount of tonnage to that port.

* * *

Desperate from the acute shortage of ships, Portland grain interests have thrown aside every bit of respect that should be shown a historical antiquity, and have made a sensational and irreverent attempt to charter the 126-year-old British convict ship SUCCESS, to carry a cargo of wheat from the Columbia river to Australia. The Portland interests offered a rate of 105 shillings a ton. SUCCESS has a cargo capacity of 1,100 tons. She could make the voyage from the Columbia river to Australia in four or five months. At the rate of 105 shillings a ton, SUCCESS would earn a gross amount of $25,000 on her cargo, less an expense of $7,000.

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Red Hot Tips From the Trade

Pertinent Suggestions and Personal Gossip

TESTS conducted on calorized metal soot blower units built by the Diamond Power Specialty Co., Detroit, as a part of the company's mechanical soot blower system for water tube boilers, have, it is said, demonstrated a great resistance to deterioration on the part of these units. It is claimed that these devices, subjected continuously to combustion gases at high temperatures in working boilers for more than a year, show no signs of disintegration. The Diamond Power Specialty Co. has been granted the exclusive right to the use of the calorizing process for mechanical soot blower units, by the General Electric Co., patentee.

Opens Branch Offices

Engberg's Electric & Mechanical Works, St. Joseph, Mich., announces that it has established branch offices as follows: New York, 39 Cortlandt street, D. J. Rowland, manager; Chicago, Fisher building, Frank H. Pond, manager; Milwaukee, Wells building, Fred H. Dorner, manager. These branch offices have been opened to meet an increased demand for the company's products.

Changes Name

The name of the American Car & Ship Hardware Mfg. Co., New Castle, Pa., recently was changed to the Johnson Bronze Co. The company announces that its plant is being enlarged and that this change in name has been made for the convenience of the trade and will not interfere with the policy or personnel of the business.

Describes Flue Tools

A 95-page catalog has been issued by Gustav Wiedeke & Co., Dayton, O., showing a complete line of tools for boiler tubes. The various devices described include tube expanders for standard and arch tubes adapted to either hand or power use, beading tools, superheater tube expanders, pneumatic hammers, ratchet wrenches, water tube boiler expanders and tube cutters. In addition to the information devoted to the products manufactured by the company, there are a number of charts showing various types of American locomotives and small cuts of English and continental passenger locomotives. Practical suggestions are given for setting and tightening copper ferrules and tubes as adopted by many American ship yards.

Ship Yard Generates Own Oxygen

The increasing use of oxygen by ship builders in welding and cutting operations has brought a demand for self-contained electrolytic oxygen-producing devices.

A recent installation of this sort at the plant of the Fore River Shipbuilding Corporation, Quincy, Mass., is of considerable interest. This plant consists of a 75-horsepower crude oil engine, belt-connected to a 45-kilowatt direct current Westinghouse generator, with electrolyzer, gasometers, compressors, motors and switchboards. Provision is made for compressing the gases in cylinders to be used in distant parts of the plant, or on board ship, where pipes cannot be carried. The plant, which is housed in a building of sheet steel, 24 x 40 feet in dimensions, was installed by the National Ox-Hydric Co., Chicago. The electrolyzer is of the filter press type, consisting of several decomposition chambers connected in series. These chambers are formed by clamping together a number of cast iron electrodes, carefully insulated each from the other by rubber-bound asbestos diaphragms. The electrodes are corrugated to increase their surface, the corrugations forming vertical channels, through which the gases rise to the upper part of the plates. The electrodes are nickel plated to render them impervious to oxygen and the alkali in the potash solution.

The gases separate from the solution in chambers at the top of each electrode, and pass off in ducts which extend through each plate to form continuous conduits.

The electrolyte employed is a 21 per cent solution of pure caustic potash in distilled water. Decomposition of the water by the electric current consumes only a few gallons per day, depending upon the quantity of gas desired. The water is fed by an automatic device which maintains a constant level.

A double unit plant, the largest yet installed by this company, is being erected in Chicago, adjacent to the works of a company using several thousand cubic feet of gas daily. About half the output will be consumed by this concern, the remainder being compressed into cylinders and sold to other users.

Builds Floating Hangar

The American Bridge Co., Pittsburgh, has completed a floating hangar for the United States government at its plant at Ambridge, Pa. The barge is 60 x 225 feet, is 6 feet deep and will draw about 18 inches of water. The roof is arched and is large enough to cover one of the government's new dirigibles. The hull is divided into eight water-tight compartments. The hangar will be towed from Ambridge to New Orleans and thence to Pensacola, Fla.

Will Build Vessel

Captain Alexander McDougall, Duluth, Minn., announces that he is organizing the McDougall & Neath Co. to build a Welland canal size steamer, probably at Duluth. The details of the proposed operations of the new company have not been fully settled.

The March issue of Safety Heating & Lighting News, published by the Safety Car Heating & Lighting Co., New York City, contains an interesting article on lighting the Detroit and Marys rivers, portions of which, together with the illustrations, were published in the April issue of *The Marine Review*.

An official announcement states that the Chester Ship Building Co., Chester, Pa., has on hand contracts for 14 vessels for home and foreign companies, aggregating in value about $18,000,000. The list includes nine tank ships, the others being freight vessels of the regular type. These contracts will keep the yard busy for three years, it is estimated, the first ship to be launched in June and one every two months thereafter.

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Equipment Used Afloat and Ashore

Tank Sounder and Draft Gage—Fire-Tube Superheater

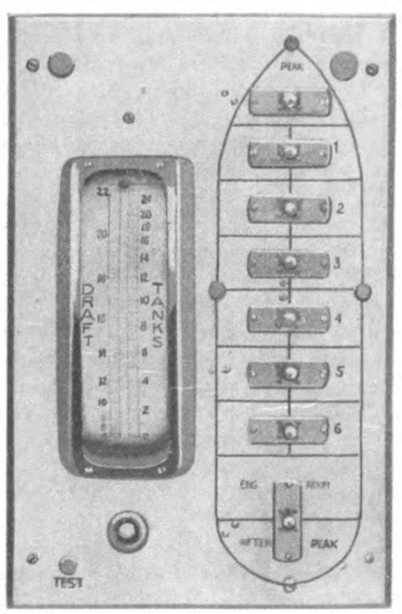
A DEVICE for instantly indicating the depth of water in any tank of a vessel and the draft has been developed by the Marine Electrical Co., Lorain, O. The indicator may be placed at any point on the ship, but it is usually used in the engine room and in the pilot house. By simply pressing the button corresponding to the tank which is to be sounded, the pointer indicates a figure on the dial of the instrument representing the number of feet of water in the tank. The device acts so quickly that it is claimed all of the tanks of a ship may be sounded in less than a minute regardless of weather conditions. It is operated with alternating current, and therefore may be located in any part of the ship without danger of affecting the ship's compass. Current is derived from a rotary converter operated from the ship's dynamo or storage battery.

First Marine Fire-Tube Superheater

The fire-tube superheater has been extensively applied in marine service by European owners during the past six years with very gratifying results. In America, however, notwithstanding the fact that the superheater is well established both in industrial plants and in locomotive service, about 15,000 superheater locomotives now being in use, the first marine installation was made about three months ago. In fact the results obtained from the operation of over 200 superheater locomotives led to the installation of a Schmidt high temperature fire-tube superheater by the marine department of the Lehigh Valley railroad on its tug, WYOMING.

WYOMING is a vessel of 398 gross tons and has a towing capacity of 5,000 tons. She is 152 feet long, 27 feet 3 inches beam and has a draft of 16 feet and is propelled by a triple expansion engine with cylinders 17 inches, 25 inches and 43 inches in diameter by 30 inches stroke. Steam is furnished at 180 pounds pressure per square inch by a single Scotch boiler, to which is applied a fire-tube superheater furnished by the Locomotive Superheater Co., New York. The boiler has four furnaces and is 15 feet in diameter by 12 feet long over-all, the tube sheets being 8 feet 3 inches apart. It has a total evaporative heating surface of 2,926 square feet and a total grate area of 86.6 square feet. The superheater has a heating surface of 758 square feet and is made up of 80 units arranged in three groups. These groups are each made up of a saturated steam and a superheated steam header to which the ends of the units are secured. The groups are independent in their action, being separated from each other by valves which may be closed when desired.

Two pyrometers are used to indicate the degree of superheat obtained, one of these instruments being located in the boiler room and the other just above the throttle in the engine room. The degree of superheat is governed by a mixing pipe, the superheated steam being cooled to any desired temperature by the admission of saturated steam to the main steam pipe. The average superheat obtained is about 185 degrees, the steam temperature averaging about 565 degrees Fahr., at 180 pounds pressure.



TANK SOUNDER AND DRAFT GAGE

Since the installation of the superheater, WYOMING has been in daily service between Perth Amboy, N. J., and the New England coast hauling coal barges, some of which carry as much as 4,800 tons. During this time the coal has been weighed daily and care has been taken to secure reliable data on which to base conclusions as to the effect of the superheater. At the end of three months, WYOMING is said to have shown a saving of over 15 per cent in fuel as compared with a similar period in the same service, prior to the application of the superheater. It has also been possible to keep the boat going constantly, thereby increasing the effectiveness of its operation in this service. The results have been such that the Lehigh Valley has announced its plan to equip the other vessels of its fleet as rapidly as possible.

Fundamentally the application of the superheater in marine service does not differ from its application to the locomotive. The arrangement of the headers and the design of the units, however, is necessarily somewhat different. The unit pipes are of small diameter, made up in a number of loops, each of which extends into a single tube, and when the superheater is assembled practically all the boiler tubes are occupied.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC. REQUIRED BY THE ACT OF CONGRESS OF AUG. 24, 1912,

Of *The Marine Review*, published monthly, at Cleveland, O., for April 1, 1916.

State of Ohio, county of Cuyahoga.

Before me, a Notary Public, in and for the state and county aforesaid, personally appeared A. O. Backert, who, having been duly sworn according to law, deposes and says that he is the business manager of *The Marine Review* and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of Aug. 24, 1912, embodied in section 443, Postal Laws and Regulations,

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher, The Penton Publishing Co., Cleveland, O.

Editor, H. Cole Estep, Cleveland, O.

Business Manager, A. O. Backert, Cleveland.

2. That the owners are: (Give names and addresses of individual owners, or, if a corporation, give its name and the names and addresses of stockholders owning or holding 1 per cent or more of the total amount of stock.)

John A. Penton, Cleveland, O.
A. O. Backert, Cleveland, O.
G. W. Hotchkiss, Cleveland, O.
R. E. Power, Cleveland, O.
O. P. Letchworth, New York, N. Y.
W. B. Ullman, Chicago, Ill.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.)

None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

A. O. Backert, Manager.

Sworn to and subscribed before me this 24th day of March, 1916.

(Seal) Joseph D. Errico.

(My commission expires June 30, 1918.)

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Chicago Ship Building Company

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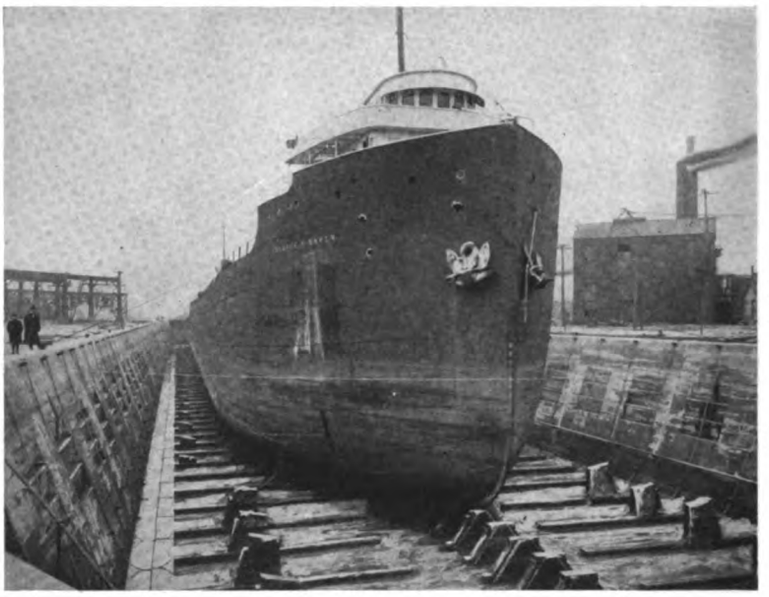
or
Freight

Any Size



Dimensions of Dry Dock

	Feet
Length -	734
Width:	
At Top -	103
At Bottom -	88
Depth -	22½

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Complete Facilities for Rapid Repair Work
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COLLINGWOOD SHIPBUILDING CO.

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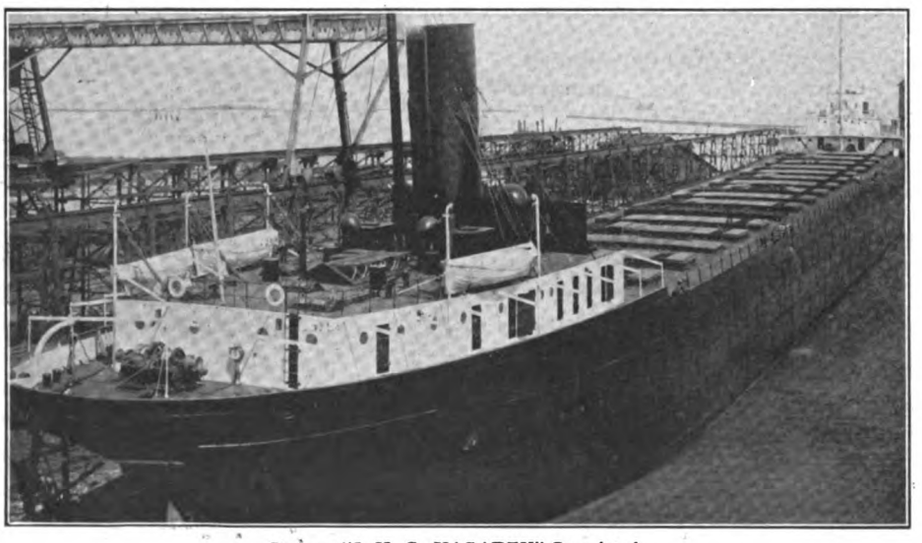
STEEL and WOODEN SHIPS, ENGINES, BOILERS, CASTINGS and FORGINGS

PLANT FITTED WITH MODERN APPLIANCES FOR QUICK WORK



Steamer "J. H. G. HAGARTY" Completed

DRY DOCKS and SHOPS EQUIPPED TO OPERATE DAY or NIGHT on REPAIRS

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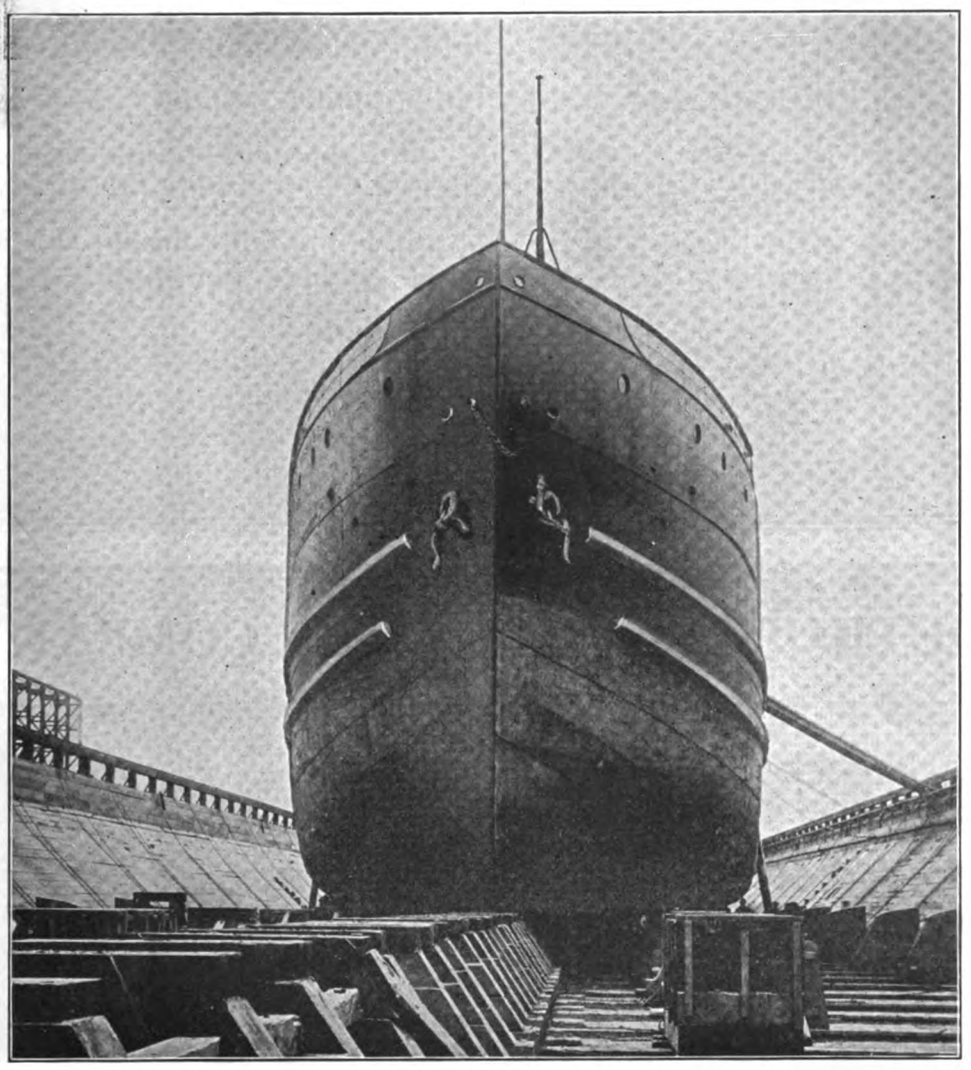
THE TOLEDO SHIPBUILDING COMPANY



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EDWARD HOPKINS, Naval Architect

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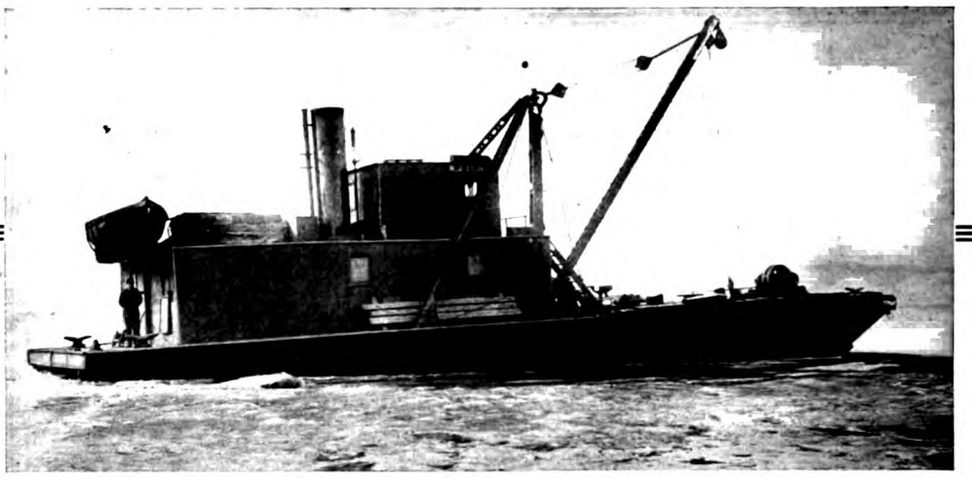

MARINE REPAIR STEAMER "ROBERT J. CLOSE"

Equipped With

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Builders and Repairers of Ships of all types for GREAT LAKES and SALT WATER SERVICE.

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DETROIT SHIPBUILDING COMPANY

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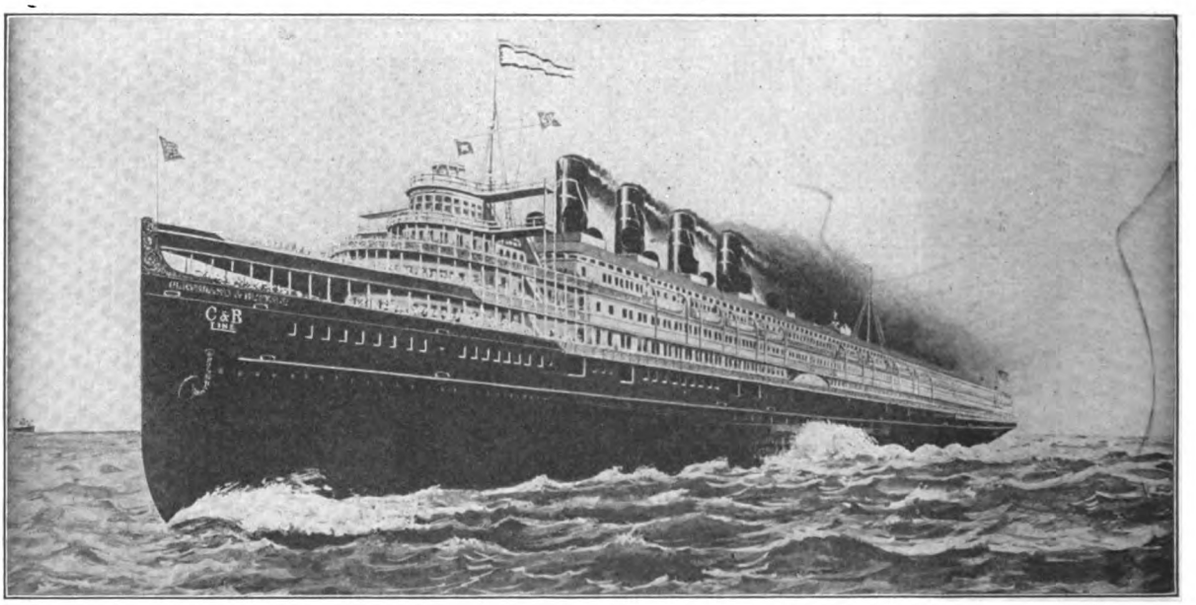

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Manufacturers of BRASS MARINE HARDWARE and BRASS SPECIALTIES.
Builders of Metallic Life Boats and Clark Patent Metallic Life Rafts.

Steel Shipbuilding Plant at Wyandotte, Michigan.
First-class equipment for making hull and machinery repairs.

Dry Docks, Machinery Works and General Offices, foot of Orleans Street, **DETROIT, MICH.**

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Ours is not the ordinary kind of dry dock. ***One*** of the distinct advantages that we have over others is the ***marine railway,*** which is 500 feet in length. This railway allows us to haul out craft and move them around so that we can take advantage of our 5 acres of property, thus giving us an immense capacity. We employ a force of 75 men who have at their disposal every modern convenience, including a complete mill for getting out material; a large up-to-the-minute, electric derrick; a great number of electric drills, etc. One of the boats on which we are now working, is the fuel lighter, Wm. G. Perry, owned by the Pittsburg Coal Co., length 175 feet; beam 34 feet.

A New, Complete Dry Dock

at Your Service!

We Build, Rebuild and Repair

anything that floats, up to 200 feet in length, and with draft not exceeding 12 feet.

We specialize

Large and small ***Vessels, Tugs, Power Boats*** and ***Yachts.***

Put your proposition up to us and you will not be disappointed.

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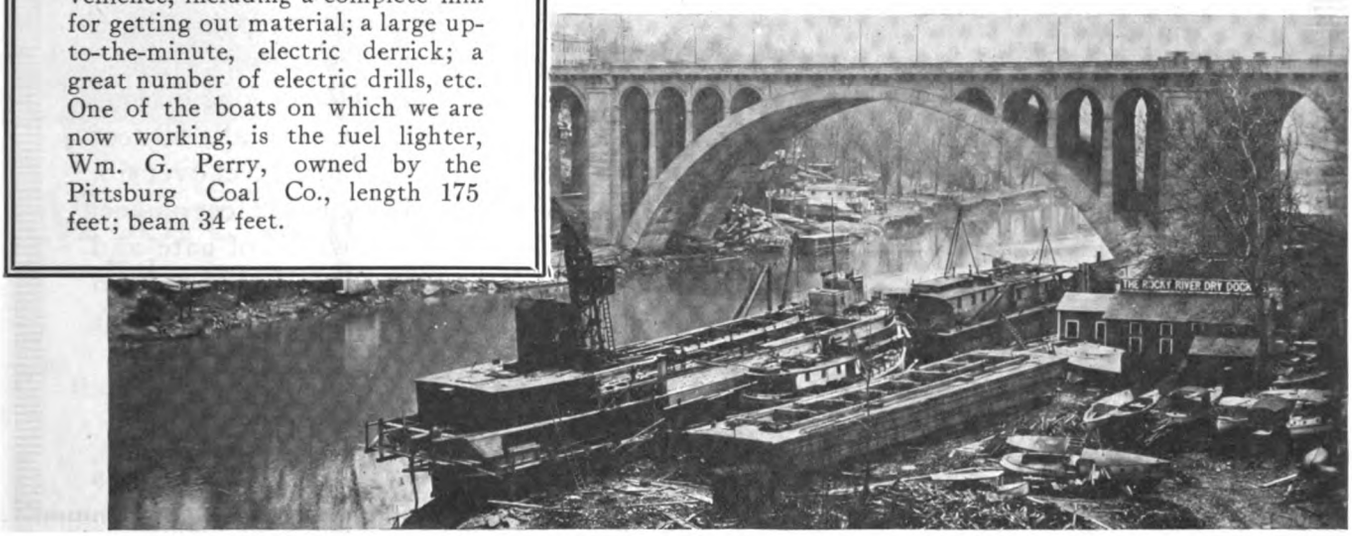

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General Repairs on Wooden and Iron Vessels

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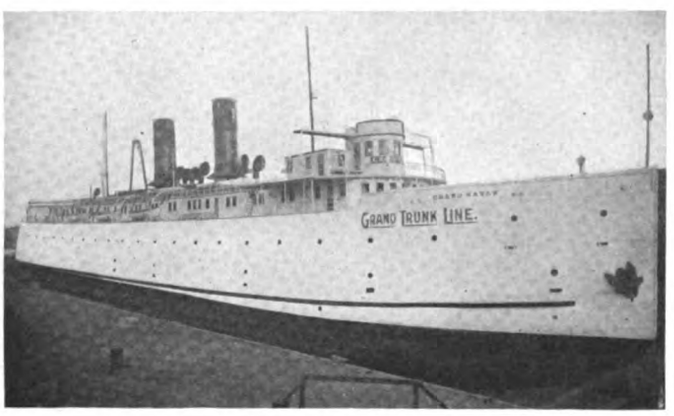

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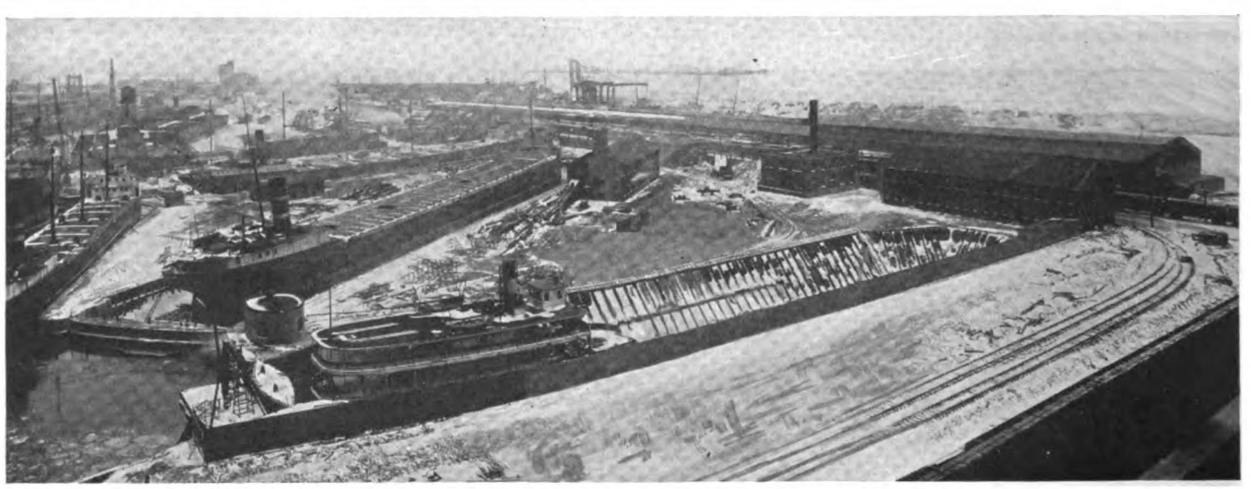
We have two ship yards offering every facility for the repair of both steel and wooden vessels. South Yard Dock is 450 feet long on keel blocks; 460 feet over all; 60 feet width of gate and 16 feet over sill. West Yard Dock is 312 feet on keel blocks; 45 feet width of gate and 12 feet over sill. Rudder pit in each dock. Electric light for night work.

Residence Phone
F. W. Smith, Manager
Lake 467

Main Office at South Yard
Foot of Washington Street

Telephone—Hanover 3
West Yard—Hanover 2555



The Buffalo Dry Dock Company

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With our excellent equipment we are enabled to do all kinds of ship repairs at reasonable cost to the owners, whose patronage is solicited with the guarantee of satisfaction in all particulars.

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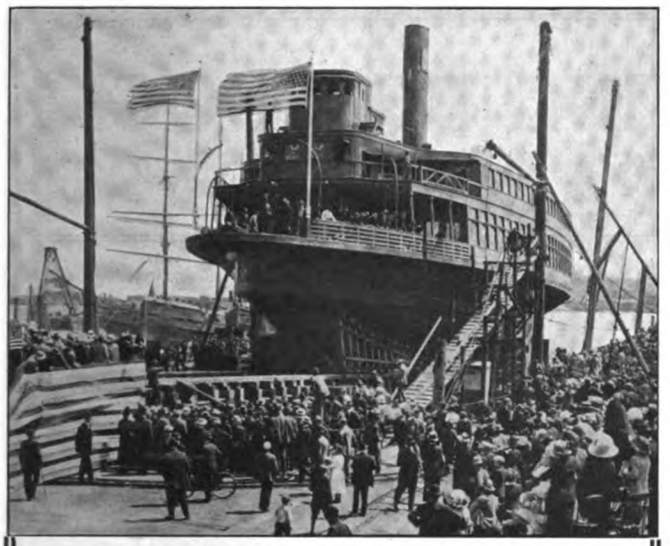

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MODERN MARINE BOILERS

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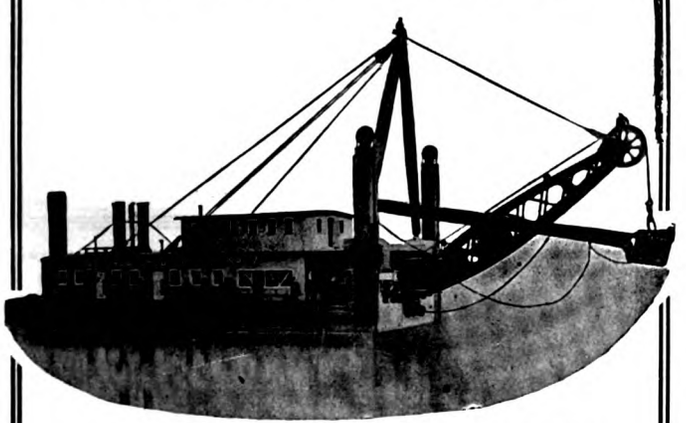

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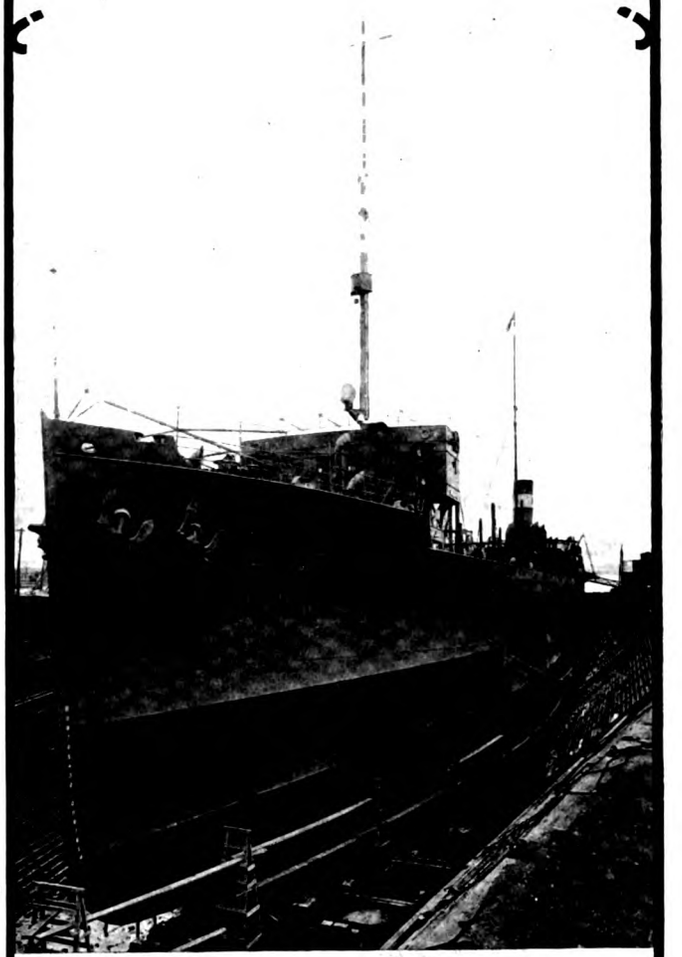
FERRYSBURG, MICHIGAN

Our Dry Docks SAVE TIME

Two Docks, coupled with Complete Shop Facilities, cut repair periods to a minimum.

	Upper Dock	Lower Dock
Length on Keel Blocks, feet	600	437
Width of Block Floor, feet	62	50
Draft over Sill at Low Water, feet	22½	22½



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Our new building slips take vessels up to 325 feet long, 50 feet beam and 32 feet deep. Our yard is specially laid out for rapid construction. We also have auxiliary building slips for small craft.

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Particular Attention Given to
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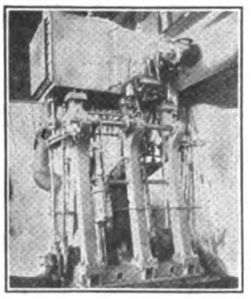

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Carriage accommodates every ship of Welland Canal size.

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HIGH CLASS WORK

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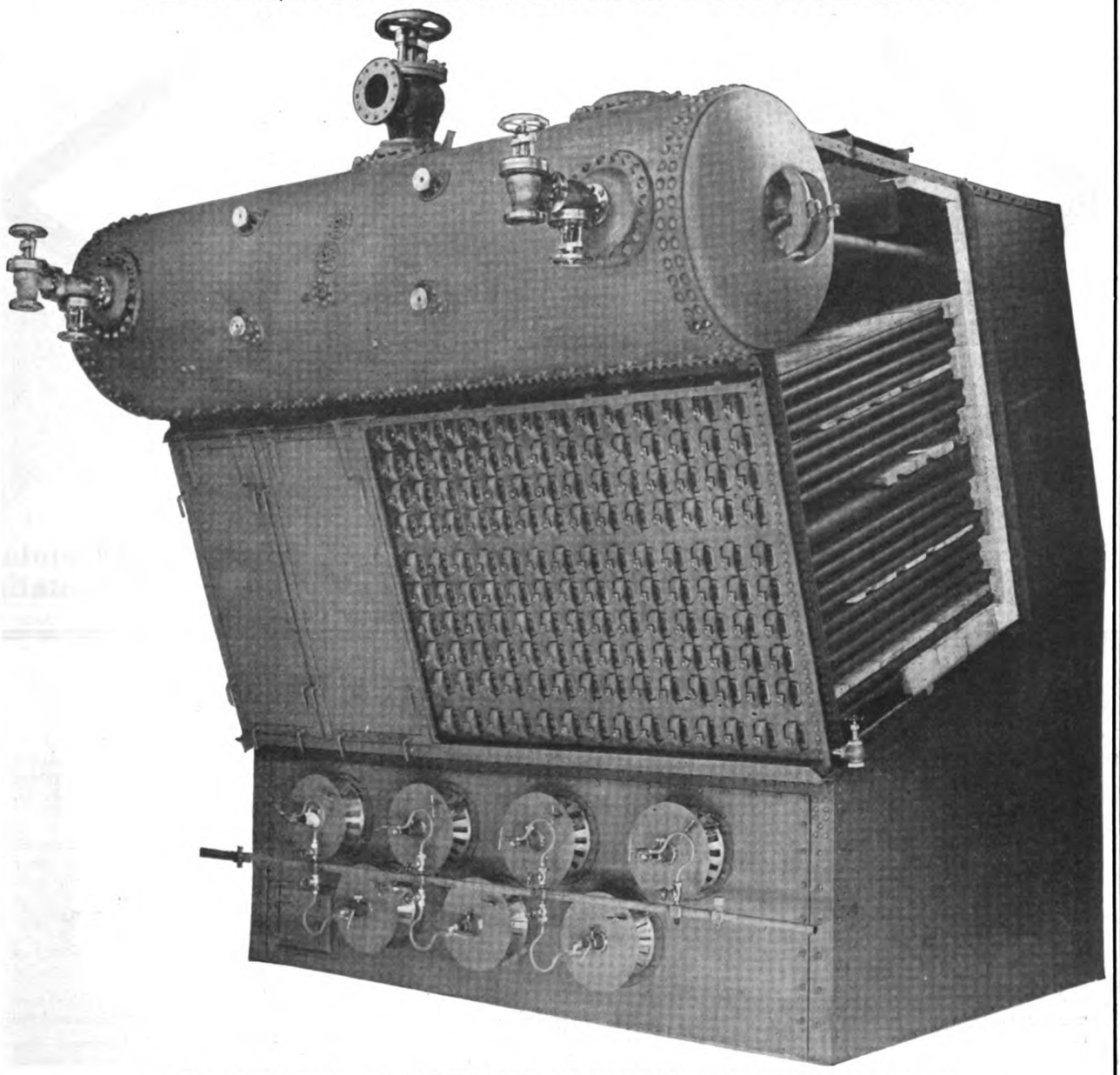
ONE OF THREE FOR SUPPLY SHIP No. 1

4275 SQUARE FEET HEATING SURFACE EACH



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IMPROVED AND MOST RAPID CIRCULATION

GENERATING TUBES EXPANDED

NO OTHER JOINTS NO STAY BOLTS

WRITE FOR RESULTS OF TESTS

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Eckliff Automatic Boiler Circulators

On the Inside—

that's where most serious trouble starts. This is true of our physical bodies, our social structure, our industrial organizations, our political institutions—in every sphere of human activity.

Such trouble gains dangerous headway before its results are apparent. And *then*—the cost of correcting the trouble is enormous.

This excessive cost is the price we pay for not looking *into* things and *preventing* the trouble. It is the Penalty for Procrastination.

Scotch Boiler troubles *start inside*. They are due almost entirely to lack of proper circulation and equalization of temperatures.

Eckliff Circulators, by creating perfect circulation and uniform temperatures, *positively prevent* Scotch Boiler troubles. Send for the proofs —ask for the Booklet.

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Create and Maintain Perfect Circulation

FIRE TUBE MARINE SUPERHEATER

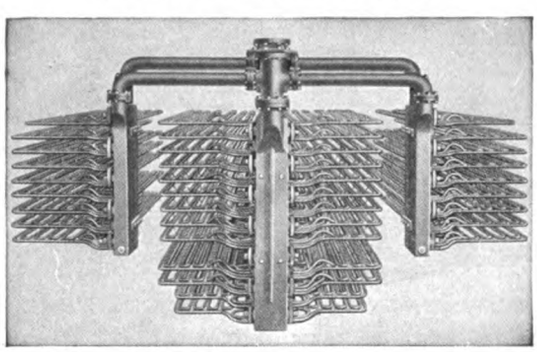
EIGHT REASONS WHY

1. It is adaptable to either new or existing boilers of the fire tube type and can be applied with no change in design or construction.

2. It renders possible an increase in output of boiler horse power from a given boiler plant, 10% to 20%.

3. It will produce the same power output with fewer boilers.

4. It reduces the size of the bunkers, thereby reducing the draft of the vessel with a given cargo or making possible an increase in revenue cargo.



5. It results in a saving of fuel over saturated plants, both operating under the same draft conditions, of 10% to 20%.

6. It reduces the maintenance costs by the prevention of water hammer, leaky flanges and condensation in the cylinders.

7. It does not prevent rapid, thorough and frequent cleaning of the tubes.

8. Its construction provides easy access to all screwed joints and the easy removal of the parts.

LOCOMOTIVE SUPERHEATER COMPANY

30 Church Street, NEW YORK, N. Y. **Peoples Gas Bldg., CHICAGO, ILL.**

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Real bargains in Passenger and Freight Boats, Dredges, Tugs, Dredging Machinery, Engines, Boilers, Cranes, and other opportunities are awaiting you.

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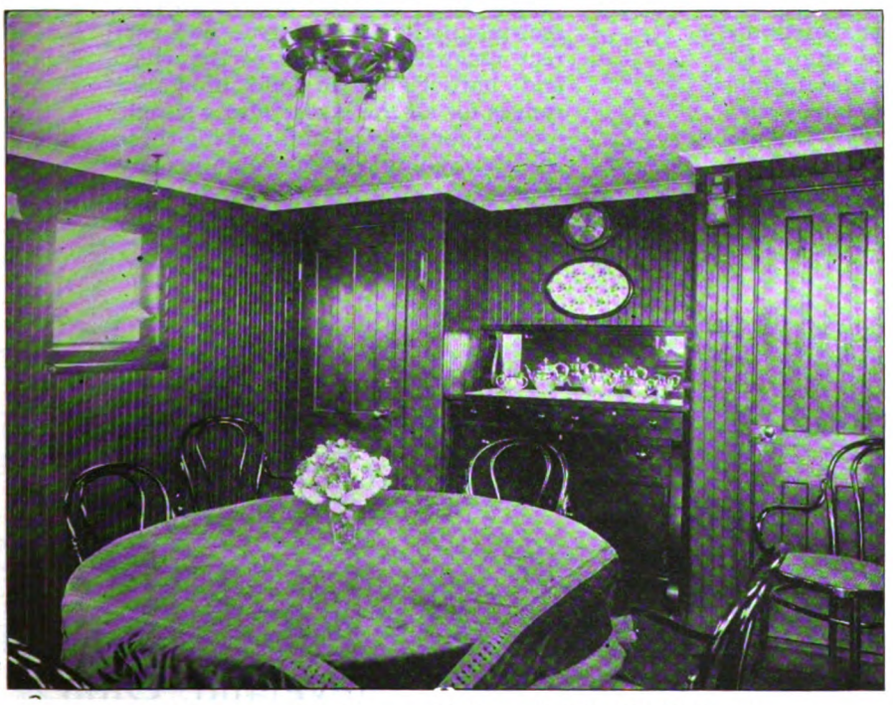
BYERLYTE DECK FLOORING

The only successful composition flooring for ships



Diningroom of the Steamer Underwood of the Erie Railroad Lake Line covered with Byerlyte

Vessel owners are recognizing the wonderful adaptability of Byerlyte deck flooring for ships. It absolutely will not crack; it binds perfectly with either wood or steel; it is waterproof, fireproof and vermin-proof; it is entirely mineral, is indestructible and will wear forever.

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We Have Them All!

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By Robert Curr

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It shows, step by step, how to build a vessel from the mold loft floor, the cheapest method of construction. Every piece of plate and shape is taken up and the method of laying off clearly explained. The book is copiously illustrated with hundreds of line drawings and numerous photographs and affords in itself, a liberal education in the art of shipbuilding as practiced on the Great Lakes.

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By Clarence E. Long

Price $2.50 Postpaid

Contains all the true and mean correct magnetic courses; true and correct magnetic bearings of the river and harbor lighted and unlighted ranges for all the lakes; also a simple method for shaping and making these courses by any compass and for any boat.

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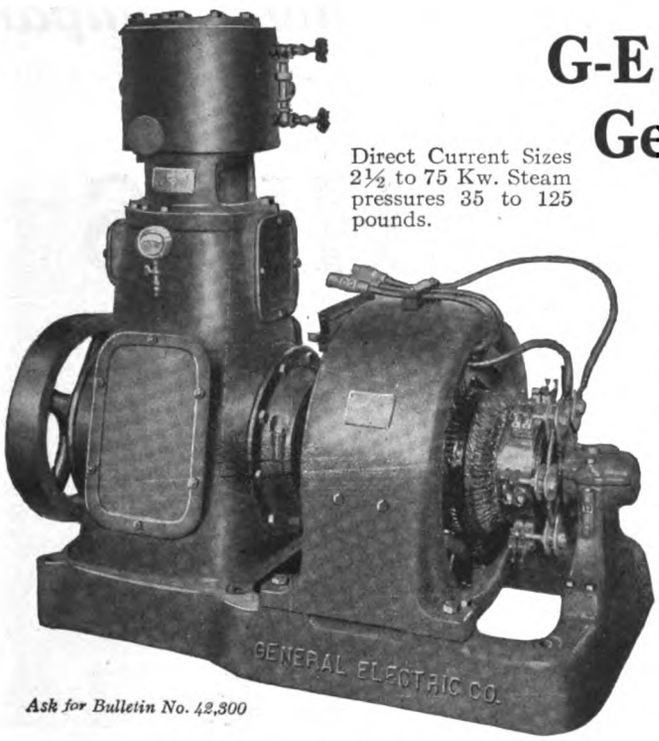

Direct Current Sizes 2½ to 75 Kw. Steam pressures 35 to 125 pounds.

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They are designed especially for marine work—which demands light, compact and durable sets of close regulation and quiet operation with a minimum of attention.

In addition to these units in sizes from 2½ to 75 Kw. this company manufactures a complete line of generators suitable for direct-connected operation.

The Standard of Reliability

for electric power equipment on board ship, has been established and maintained for many years by the General Electric Company.

Maximum reliability in the long run at sea is obtained by specifying the products distinguished by

this trade mark, the guarantee of excellence on goods electrical.

General Electric Company

General Office: Schenectady, N.Y.

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The American Ship Building Company

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Builders of

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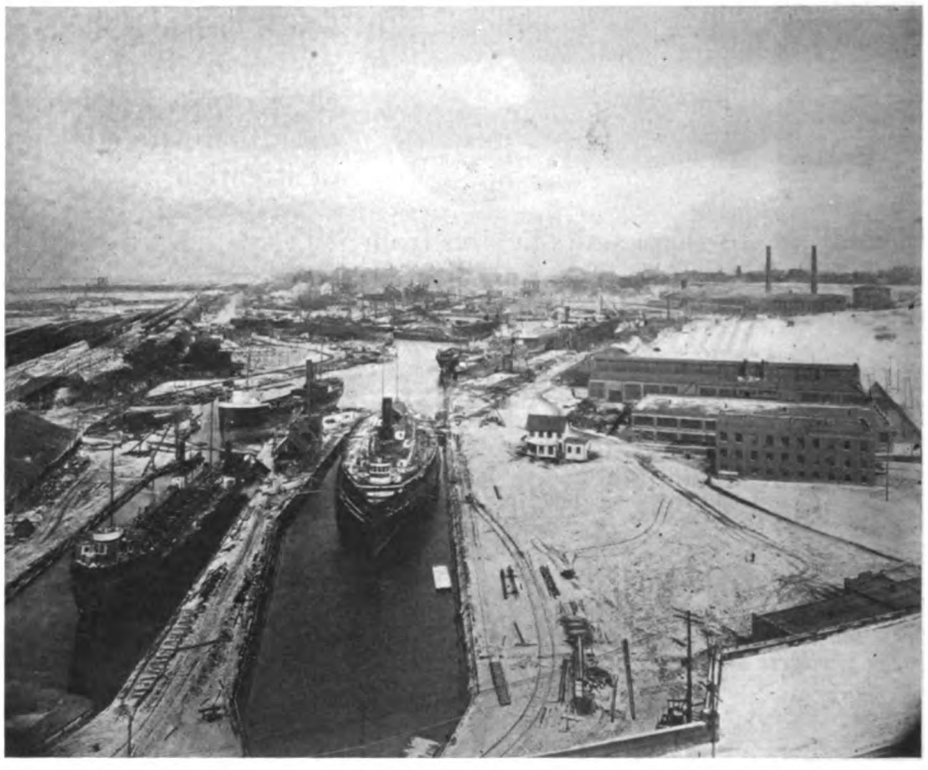
For

Lake, Ocean, Sound and River Service

Marine and Stationary Engines

Boilers, Windlasses and Auxiliary Machinery



Birdseye view of our new Cleveland plant, showing our two large dry docks

¶ Special Facilities for the Construction of Ocean Going Steel Steamers, coupled with extensive experience assures satisfactory results on salt water work.

We Operate Fast Dry Docks and Complete Plants at Cleveland and Lorain

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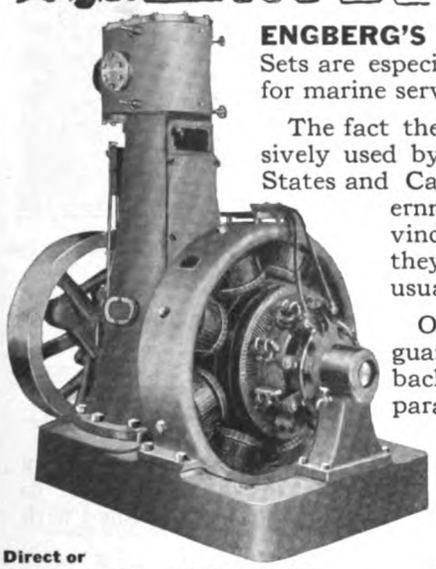
ENGBERG

DIRECT CONNECTED

Dynamos and Engines



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The fact they are extensively used by the United States and Canadian Governments is convincing proof they possess unusual merit.

Our iron clad guarantee stands back of each apparatus.

Bulletins fully describing this equipment sent upon request.

Direct or Alternating Current—1 to 75 KW

Manufactured by

ENGBERG'S
ELECTRIC & MECHANICAL WORKS
6 Vine St. ST. JOSEPH, MICHIGAN

MECHANICAL AND ELECTRICAL
SHIPS TELEGRAPHS

Rudder Indicators

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Electric Whistle Operators

Electric Lighting Equipments, Fixtures, Etc.

Electric and Mechanical Bells

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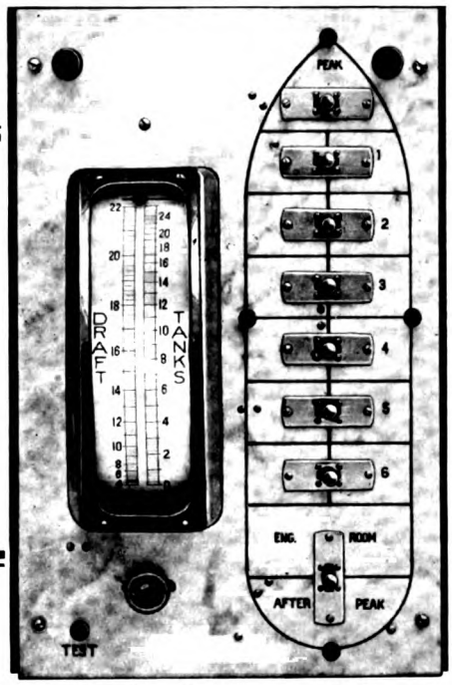
Loud Speaking Marine Telephones

Installations

Chas. Cory & Son, Inc.
290 HUDSON STREET, NEW YORK CITY

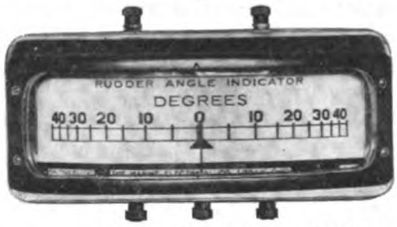
Here is Instant Information
for both
Captain and Engineer
regarding
Ballast and Draft



By simply pressing the button which corresponds to the tank you wish to sound, the pointer will immediately indicate in feet and inches the depth of water in that particular compartment. All compartments can be sounded in less than a minute regardless of weather conditions.

Operates with rheostat or contact buttons.

The Walton Rudder Angle Indicator



Shows every move of rudder. Will not affect the compass. Illuminated by lamps of one-tenth candle power inside of instrument. :: ::

Ask us for full details

Marine Electrical Co.
Lorain, Ohio

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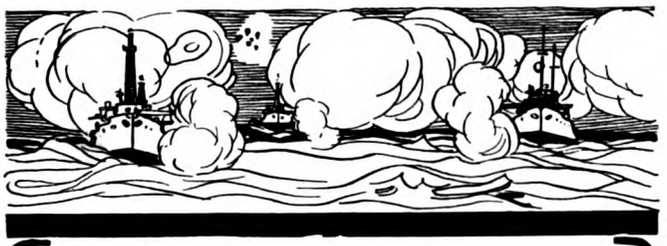

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The records for Economy, Capacity and Endurance in the Navies of the World, are held by

BABCOCK & WILCOX FORGED STEEL

Marine Water-Tube Boilers

and

Superheaters

Moreover, the same superior characteristics have been proved in the Merchant Marine.

Do you know that Babcock & Wilcox Boilers and Superheaters in one vessel are saving more than 15 per cent over Scotch boilers in sister vessels?

Isn't such a great reduction in coal bills of very great interest to you?

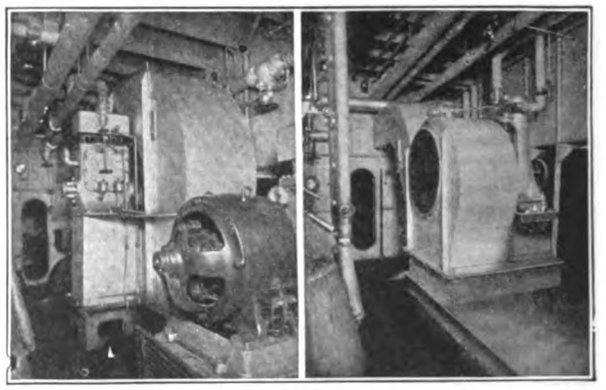
All essential parts of Babcock & Wilcox Boilers are heavier than the corresponding parts in Scotch boilers, thus giving greater security against corrosion.

Let us send you full details explaining why "Babcock & Wilcox" stands for **safety, ease of cleaning** and **simplicity of operation.**

A large portion of our business consists of "repeat-orders." You know what that means. ***Write us at once.***

The Babcock & Wilcox Co.

NEW YORK and LONDON



72" Steel Plate Fan—**Both for same duty**—36" "Sirocco" Multi-blade Fan

"Sirocco" TRADE MARK.

Multi-Blade Fans for Forced Draft

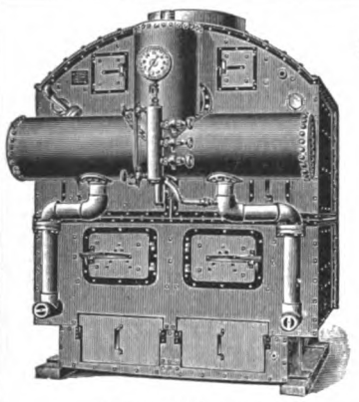
Save Money because they **Save Power.** They save power because their design is such as to make use of **every bit** of energy consumed with the least possible waste.

Catalogue No. 34316 contains reliable information on Mechanical Draft. Yours upon request.

AMERICAN BLOWER COMPANY

DETROIT, MICHIGAN, U.S.A.

Canadian Sirocco Co., Limited, Windsor, Ont., Manufacturer for Canada



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Almy Water Tube Boiler Co.

Builders of Sectional Water Tube Boilers for all types of vessels

Providence, R. I. U. S. A.

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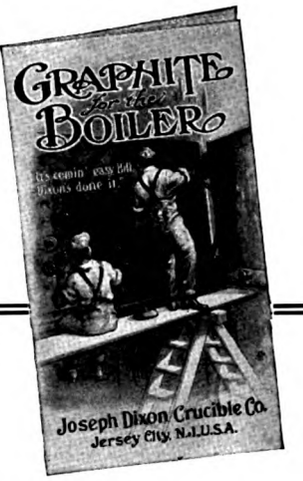

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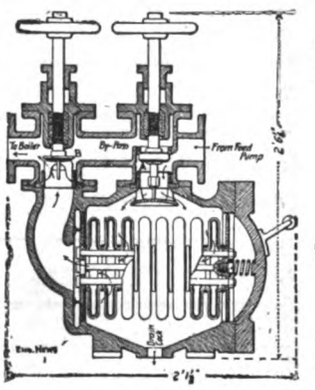

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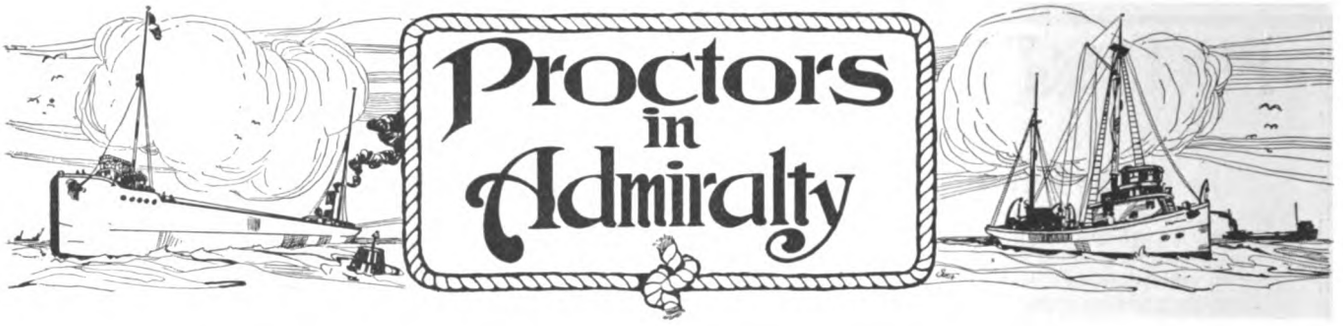

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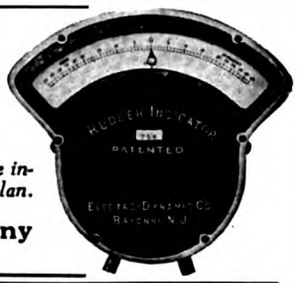

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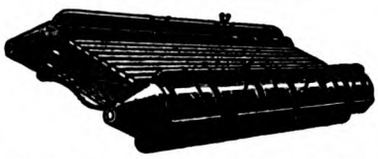

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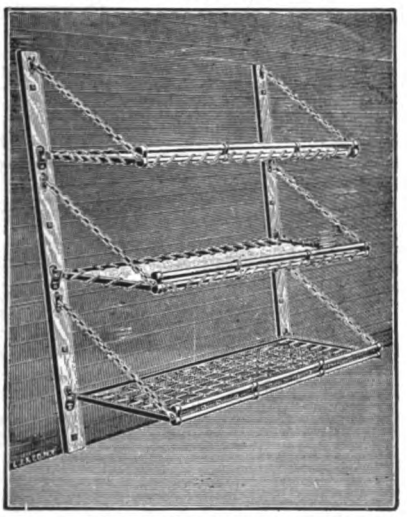

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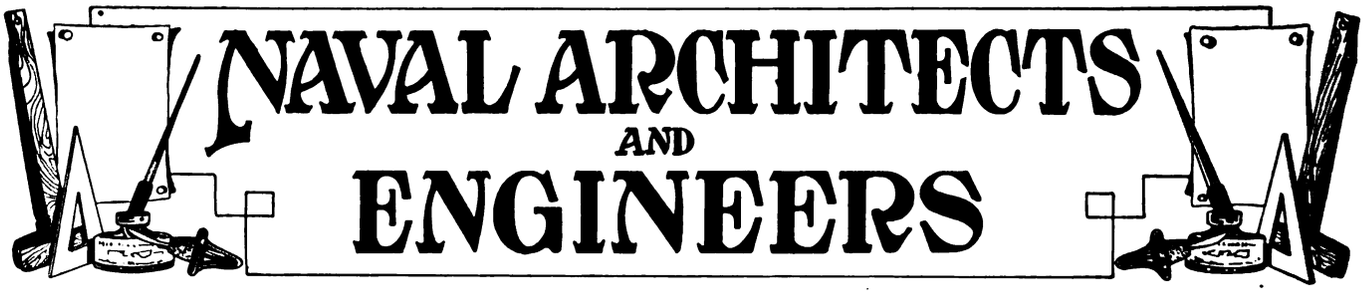

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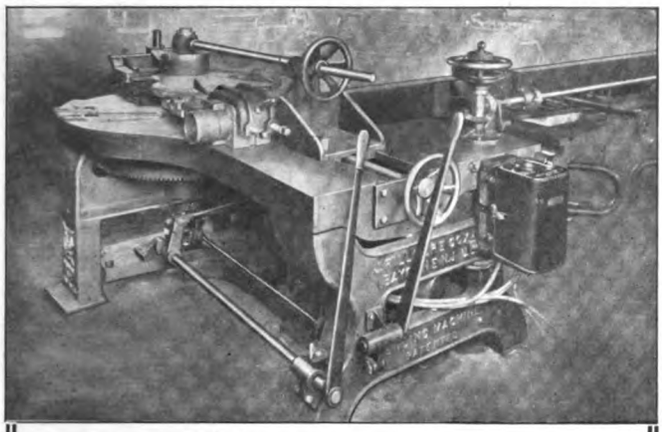

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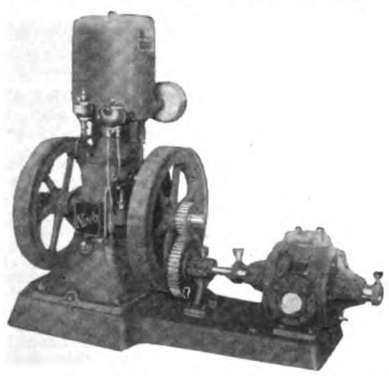

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Welin Marine Equipment Co.

DAVITS & DAVIT FALLS.
Welin Marine Equipment Co.

DECK FLOORING.—(Composition.)
Byerley and Sons

DERRICKS.
Dake Engine Co.
Superior Iron Works

DESIGNERS.—(Ship.)
Babcock & Penton
Curr, Robert
Furstenau, M. C.

DIES.
Armstrong Mfg. Co.

DIVING APPARATUS.
Morse, A. J., & Son.
Schrader's Sons, A., Inc.

DOCKS—(Designers of.)
Donnelly, Wm. T.

DOCK BUILDING.
Breymann, G. H., & Bros.

DRAFT.—(Artificial and Mechanical for Boilers.)
American Blower Co.
American Ship Building Co.
Detroit Ship Building Co.

DRAFT GAGE.
Blackmer Rotary Pump, Power & Mfg. Co.
McNab Co.
Marine Electrical Co.

DREDGING OUTFITS.—(Constructors of.)
Buffalo Dry Dock Co.

DREDGING MACHINERY.
American Engineering Co.
Chase Machine Co.
Superior Ship Building Co.

DROPS—(Wharf.)
American Engineering Co.

DRY DOCKS.
American Ship Building Co.
Baltimore Dry Dock & Ship Bldg. Co.
Chicago Ship Building Co.
Collingwood Ship Building Co.
Detroit Ship Building Co.
Kennedy Valve Mfg. Co.
Manitowoc Ship Bldg. & Dry Dock Co.
Milwaukee Dry Dock Co.
Rocky River Dry Dock Co.
Seattle Construction and Dry Dock Co.
Superior Ship Building Co.
Tietjin & Lang Dry Dock Co.
Toledo Ship Building Co.

DYNAMOS.
General Electric Co.

EJECTORS.
Penberthy Injector Co.

ENAMELS.
Patterson-Sargeant Co.

ENGINEERS.—(Marine, Mechanical and Consulting.)
Babcock & Penton
Donnelly, Wm. T.
Farley, Edward P., Co.
Furstenau, M. C.
Griscom-Russel, The, Co.
Moore & Scott Iron Works.
Seattle Const. & Dry Dock Co.

ENGINEER'S SPECIALTIES
Penberthy Injector Co.
Ross Valve Mfg. Co.

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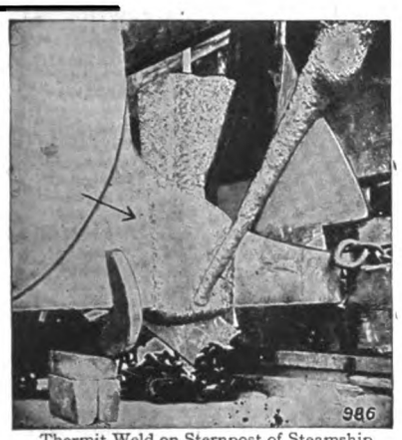

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(Registered Under Act Of Parliament.)

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It has aided in having Certificates of Masters and Officers returned to them where the same had been suspended or cancelled on improper evidence or lack of evidence; carrying the matter to the House of Lords in England when necessary.

It has taken a keen interest in having the Life Saving Apparatus on board ship kept up-to-date where a parsimonious policy tended in an opposite direction.

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14 N. Dearborn St., Chicago
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Chase Machine Co.
Engberg's Electric & Mechanical Works.
Seattle Construction & Dry Dock Co.
Superior Iron Works

ENGINES.—(Hoisting.)
American Blower Co.
American Engineering Co.
Chase Machine Co.
Hyde Windlass Co.
Superior Iron Works

ENGINES.—(Marine.)
American Blower Co.
American Ship Building Co.
Bath Iron Works
Chase Machine Co.
Chicago Ship Building Co.
Collingwood Ship Building Co.
Detroit Ship Building Co.
Fletcher, W. A., Co.
Fore River Ship Building Corp.
Johnston Bros.
Lidgerwood Mfg. Co.
Manitowoc Ship Bldg. & Dry Dock Co.
Milwaukee Dry Dock Co.
Sheriffs Mfg. Co.
Superior Ship Building Co.
Toledo Ship Building Co.
Trout, H. G.

ENGINES.—(Mooring.)
American Engineering Co.
Chase Machine Co.

ENGINES.—(Steering.)
American Engineering Co.
Hyde Windlass Co.

ENGINE STOPPING DEVICES
Mulholland Hatch Fastener Co.

FANS.
American Blower Co.

FASTENERS.—(Hatch.)
Mulholland Hatch-Fastener Co.

FILTERS.—(Feed Water.)
Griscom-Russel. The, Co.
Ross Valve Mfg. Co.

FIRE ESCAPES
McArthur Portable Fire Escape Co.

FIRE ALARM SYSTEMS.
Cory, Chas., & Sons

FIRE DEPARTMENT SUPPLIES.
Morse, A. J., & Son

FITTING OUT AND SUPPLIES.
Rocky River Dry Dock Co.

FIXTURES.
General Electric Co.

FLOORING (Composition.)
Byerley & Sons

FLOORING (Warehouse.)
Byerley & Sons

FORGINGS
Collingwood Ship Building Co.

FORGINGS.—(Steel.)
Fore River Ship Building Corp.

FOUNDERS.
Chase Machine Co.
Kingsford Foundry & Machine Works
Seattle Const. & Dry Dock Co.

FUELING COMPANIES AND COAL DEALERS.
Hall, Geo., Coal Co.
Hanna, M. A., & Co.
Lorain Coal & Dock Co.
Pickands, Mather & Co.

FURNACES.—(Boilers.)
Continental Iron Works, The

FURNACE FRONTS AND DOORS.—(Land and Marine.)
Continental Iron Works, The

GAGES.—(Steam.)
Ashton Valve Co.

GAGES.—(Water.)
Penberthy Injector Co.

GENERATORS.
Engberg's Electric & Mechanical Works.
General Electric Co.
International Oxygen Co.

GRAPHITE.
Dixon, Joseph, Crucible Co.

GRAPHITE.—(Boiler Lubricating, Greases.)
Dixon, Joseph, Crucible Co.

GRATE BARS.
Sheriffs Mfg. Co.
Trout Co., H. G.

GREASES.
Dixon, Joseph, Crucible Co.

GYPSEYS.—(Steam.)
American Engineering Co.

HAMMERS.—(Steam.)
Chase Machine Co.

HATCH FASTENERS.
Mulholland Hatch Fastener Co.

HEATERS AND PURIFIERS.—(Feed Water.)
Ross Valve Mfg. Co.

HOISTS.—(Air.)
American Ship Building Co.

HOISTS.—(Anchor.)
Superior Iron Works

HOISTS.—(Cargo, Etc.)
American Engineering Co.
Boston & Lockport Block Co.
Chase Machine Co.
Dake Engine Co.
General Electric Co.

HOISTS.—(Chain.)
Dake Engine Co.

HOISTS.—(Electric.)
American Engineering Co.
General Electric Co.

HOISTS.—(Pneumatic.)
Dake Engine Co.

HOSE.
Schrader's Son, A., Inc.

HOTELS.
Hotel Tuller

HYDROGEN GENERATORS.
International Oxygen Co.

ICE MACHINES.
Clothel Company, The
Roelker, H. B.

INDICATORS.
Cummings Ship Instrument Works
Electro Dynamic Co.
McNab Co.

INDICATORS.—(Direction.)
Cummings Ship Instrument Wks.
Electro Dynamic Co.
McNab Co.

INDICATORS.—(Recording.)
McNab Co.

INDICATORS.—(Speed.)
Cummings Ship Instrument Wks.
McNab Co.

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Hutchinson & Co.
Richardson, W. C., & Co.
Vance & Joys Co.

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Hanna, M. A., & Co.
Pickands, Mather & Co.

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McArthur Portable Fire Escape Co.

LAMPS.—(Mazda and Arc.)
General Electric Co.

LANTERNS.—(Buoy.)
Safety Car Heating & Lighting Co.

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Drein, Thomas & Sons

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Drein, Thomas & Son
Kahnweiler's Son, David
Lane, C. M., Life Boat Co.
Welin Marine Equipment Co.

LIFE RAFTS.
Detroit Ship Building Co.
Drein, Thos., & Son
Lane, C. M., Life Boat Co.

LIFE BOAT RELEASING DEVICE.
Lane, C. M., Life Boat Co.
Mulholland Hatch Fastener Co.

LIFE BOAT SYSTEM.
Lane, C. M., Life Boat Co.
Welin Marine Equipment Co.

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Kahnweiler's Sons, David
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Bauer, Justus, & Son, Inc.
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Kahnweiler's Sons, David
Lane, C. M., Life Boat Co.
Welin Marine Equipment Co.

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Safety Car Heating & Lighting Co.

LIGHTS.—(Electric.)
Cory, Chas., & Son
General Electric Co.

LOGS.—(Patent.)
Cummings Ship Instrument Works

LOGS.—(Ship.)
Walker, Thomas, & Sons
Nicholson Ship Log Co.

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Dixon, Joseph, Crucible Co.

LUBRICATING GRAPHITE.
Dixon, Joseph, Crucible Co.

LUBRICATORS.
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Kingsford Foundry & Machine Works

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Chase Machine Co.
Chicago Ship Building Co.
Collingwood Ship Bldg. Co.
Dake Engine Co.
Detroit Ship Building Co.
Fletcher Co., W. & A.
Fore River Ship Building Corp.
Johnston Bros.
Manitowoc Ship Bldg. & Dry Dock Co.
Sheriffs Mfg. Co.
Superior Iron Works
Superior Ship Building Co.
Toledo Ship Building Co.

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Marine Equipment
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Superior Iron Works

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Rocky River Dry Dock Co.

MARLINE.
Waterbury Co.

MARLINE COVERED WIRE ROPE.
Waterbury Co.

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Engberg's Elec. & Mech. Wks.

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Canadian Mercantile Marine Association.

METERS.—(Torsion.)
Cummings Ship Instrument Works

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Durable Wire Rope Co.

MOTORS.—(Electric.)
Electro Dynamic Co.
General Electric Co.

MOTORS.—(Winch.)
General Electric Co.

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Waterbury Co.

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Ritchie, E. S., & Sons.

NOZZLES.
Morse, A. J., & Sons

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Stratford Oakum Co., Geo.

OILS AND LUBRICANTS.
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OIL.—(Linseed.)
Patterson Sargeant Co.

OXYGEN AND HYDROGEN CYLINDERS AND CYLINDER STUD VALVES.
International Oxygen Co.

OXYGEN TESTING APPARATUS, WELDING AND CUTTING APPARATUS.
International Oxygen Co.

OXYGEN GENERATORS
International Oxygen Co.

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Home Rubber Co.

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Patterson-Sargeant Co.

PAINT.—(Graphite.)
Dixon, Joseph, Crucible Co.
Patterson-Sargeant Co.

PAINT.—(Hull.)
Patterson-Sargeant Co.

PAINT.—(Marine.)
Patterson-Sargeant Co.

PATENTS.
Siggers & Siggers

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Hanna, M. A., & Co.
Pickands, Mather & Co.

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Continental Iron Works, The

PIPE BENDING MACHINES.
Cox Engrg. & Tube Bending Machine Works.

PLUMBAGO.
Dixon, Joseph, Crucible Co.

POWER PLANTS.
General Electric Co.

PROJECTORS.—(Electric.)
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Sheriffs Mfg. Co.

PROPELLER WHEELS.
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Case, A. Wells, & Son
Detroit Ship Building Co.
Fore River Ships Building Corp.
Hyde Windlass Co.
Milwaukee Dry Dock Co.
Roelker, H. B.
Sheriffs Mfg. Co.
Superior Ship Building Co.
Toledo Ship Building Co.
Trout Co., H. G.

PROVISIONS.—(Ship.)
Duluth Marine Supply Co.
Erdman, Joseph
Schroeder Bros. Co.

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Boston Lockport & Block Co.

PUMPS AND APPLIANCES.—(Air.)
Kingsford Fdy. & Machine Co.

PUMPS.—(Bilge.)
Blackmer Rotary Pump, Power & Mfg. Co.

PUMPS.—(Miscellaneous Use.)
Blackmer Rotary Pump, Power & Mfg. Co.
Kingsford Fdy. & Machine Co.
Roelker, H. B.

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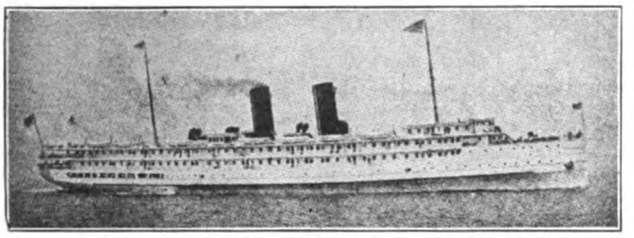

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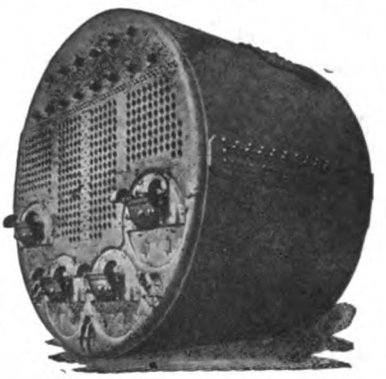

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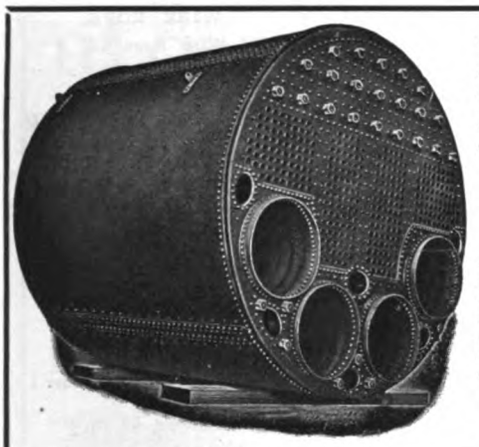

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REPAIRS.—(Boiler.)
Commercial Boiler Works, The

REPAIRS.—(Marine.)
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Buffalo Dry Dock Co.
Chicago Ship Building Co.
Collingwood Ship Building Co.
Delaney, P., & Co.
Detroit Ship Building Co.
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Goldschmidt Thermit Co.
Johnston Bros.
Kennedy Valve Mfg. Co.
Manitowoc Ship Bldg. & Dry Dock Co.
Milwaukee Dry Dock Co.
Rocky River Dry Dock Co.
St. Lawrence Marine Ry. Co.
Seattle Construction & Dry Dock Co.
Sheriffs Mfg. Co.
Superior Ship Building Co.
Tietjen & Lang Dry Dock Co.
Toledo Ship Building Co.

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Waterbury Co.

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ROPE DRIVES.
Waterbury Co.

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General Electric Co.

SHEAVES.
Boston & Lockport Block Co.

SHEAVE LUBRICATING DEVICE.
Mulholland Hatch Fastener Co.

SHEET IRON WORK
Commercial Boiler Works, The

SHIP BUILDING SYSTEM.
Isherwood, J. W.

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Bath Iron Works
Buffalo Dry Dock Co.
Chicago Ship Building Co.
Collingwood Ship Building Co.
Detroit Ship Building Co.
Fletcher, W. & A., Co.
Fore River Ship Building Corp.
Johnston Bros.
Kennedy Valve Mfg. Co.
Manitowoc Ship Building & Dry Dock Co.
Milwaukee Dry Dock Co.
Moore & Scott Iron Works.
Seattle Const. & Dry Dock Co.
Superior Ship Building Co.
Tietjen & Lang Dry Dock Co.
Toledo Ship Building Co.

SMOKE STACKS.
Lake Erie Boiler Works

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Ross Valve Mfg. Co.

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Southern Bedding Co.

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Falls Hollow Staybolt Co.

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International Mercantile Marine Co.

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American Ship Building Co.
Chase Machine Co.
Dake Engine Co.
Detroit Ship Building Co.
Hyde Windlass Co.
Sheriffs Mfg. Co.

STOCKS.
Armstrong Mfg. Co.

STOKERS.
American Engineering Co.
Babcock & Wilcox Co.

STOPPERS.—(Chain.)
American Engineering Co.

SUBMARINE ARMOR.
Morse, A. J., & Son
Schrader's Son, Inc., A.

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Babcock & Wilcox Co.
Locomotive Superheater Co.

SUPPLY HOUSES.
Duluth Marine Supply Co.
Erdman, Joseph.
Schroeder Bros. Co.

SURVEYORS.—(Marine.)
Babcock & Penton
Curr, Robert
Furstenau, M. C.

SWITCHBOARDS.
General Electric Co.

TANKS.
Bath Iron Works

TANKS.—(Riveted.)
Lake Erie Boiler Works

TANKS.—(Steel.)
Fore River Ship Building Corp.

TANKS.—(Welded Steel.)
Continental Iron Works, The

TELEGRAPH.—(Mechanical.)
Cory, Chas., & Sons

TESTS OF MATERIALS.
Babcock & Penton
Curr, Robert
Furstenau, M. C.

THERMIT.
Goldschmidt Thermit Co.

TORSION METERS.
Cummings Ship Instrument Wks.

TOWING LINES.—(Manila, Wire.)
Waterbury Co.

TOWING MACHINES.
American Engineering Co.
Chase Machinery Co.

TRAMWAYS.—(Wire Rope.)
Waterbury Co.

TRANSMISSION.—(Rope.)
Waterbury Co.

TUGS.
Bath Iron Works

TURBINES.
Bath Iron Works
Fletcher, W. A., & Co.
Fore River Ship Building Corp.

VALVES.
Ashton Valve Co.
Penberthy Injector Co.
Ross Valve Mfg. Co.

VALVES.—(For Water and Gas.)
Ashton Valve Co.

VESSEL AGENTS.
Vance & Joys Co.

VESSEL BROKERS.
Farley, Edward P., Co.
Richardson, W. C., & Co.

WELDING.—(Flue.)
Case, A. Wells, & Son

WELDING PROCESSES.
Goldschmidt Thermit Co.

WINCHES.
American Engineering Co.
Chase Machine Co.
Hyde Windlass Co.
Lidgerwood Mfg. Co.

WINDLASSES.
American Engineering Co.
American Ship Building Co.
Dake Engine Co.
Hyde Windlass Co.

WIRE.
Waterbury Co.

WIRE AND WIRING DEVICES.
General Electric Co.

WIRE ROPE.
Durable Wire Rope Co.
Waterbury Co.

WIRE ROPE DRESSING.
Dixon, Joseph, Crucible Co.

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Rocky River Dry Dock Co.

YACHT PLUMBAGO.
Dixon, Jos., Crucible Co.

YARN.—(Lath, Fodder.)
Waterbury Co.

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Drein, Thos., & Son
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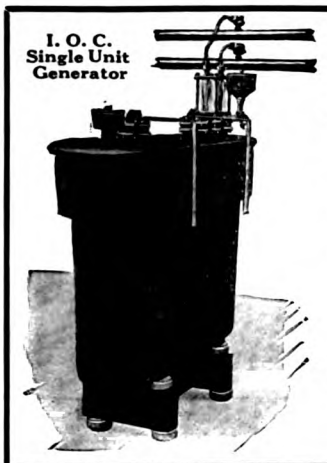

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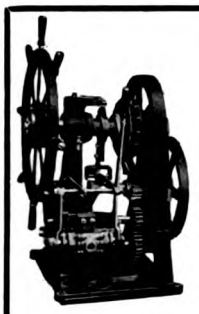

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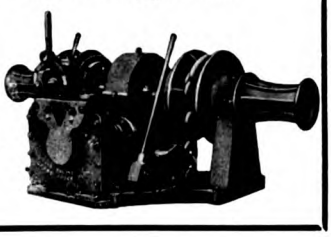

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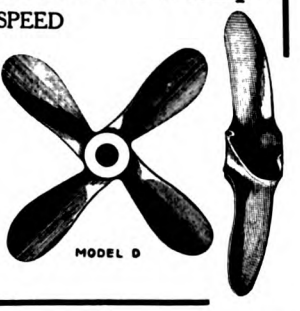

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STEAMSHIP BROKERAGE BUSINESS for Sale. Established in New York many years. A splendid opening for a man desiring to take advantage of the increased mercantile marine now building, together with the advantage of Panama Canal, which adds the Pacific Coast as a market for the smaller class of steam craft. Proprietor retiring after successful business career under less favorable conditions to those now existing. Address Box 124, THE MARINE REVIEW, Cleveland, O.

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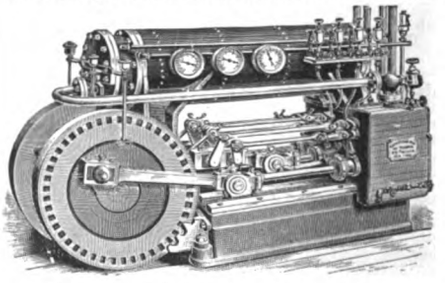

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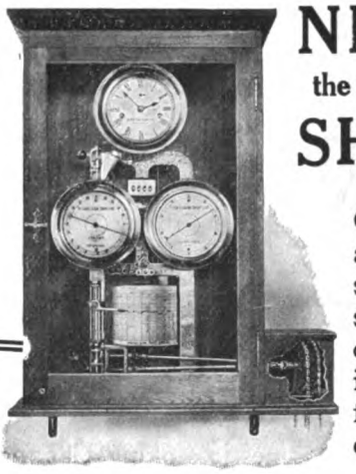

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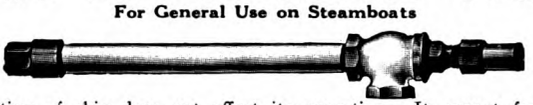
For General Use on Steamboats



Listing of ship does not affect its operation. It cannot freeze or become air bound. Keeps pipe lines free from condensation, thereby insuring your cargo. Makes the heaters heat. Does away with cylinder cocks on deck engines. Does its work regardless of temperature. More than 1,000 in successful operation on lake boats. Barton traps are dividend makers. A Barton trap installed on trial will answer the question of economy. Barton traps used on 150 boats on the lakes. (Used on steering, deck engines, forward auxiliary lines, forward main exhaust lines, after radiator lines, hot water tanks, in fact any place where a steam trap can be used the Barton trap is successfully operated.) When in Cleveland call Harvard 1532 and learn more about it.

JOHN W. BARTON

Owner of

Barton Steam Trap Co., 2707 Vestry Ave., Cleveland, O.

Formerly of Automatic Steam Trap Specialty Co., Detroit.

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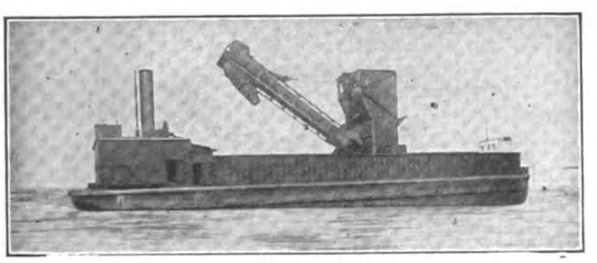
Coal

For shipment via Great Lakes in CARGO LOTS or for Fueling Vessels. Write or 'phone us for prices on best grades of Domestic, Coking, Gas and Steam coals for prompt delivery.

M.A. HANNA & Co.

M·A HANNA & Co.

PICKANDS, MATHER & CO.



Lighter "West Shore." Buffalo, N. Y.
Capacity 500 Tons per hour

FUEL LIGHTERS at Buffalo, Erie, Ashtabula, Cleveland. At Detour, Mich., a Fuel Dock equipped with shute capacity of 600 tons. Best quality Pittsburgh coal furnished at any time during day or night.

Western Reserve Building
CLEVELAND, O.

The Lorain Coal & Dock Co.

General Offices: COLUMBUS, OHIO

Producers and Shippers of ECLIPSE HOCKING AND CRESCENT PITTSBURGH COAL

Docks and Fuel Lighter LORAIN, OHIO

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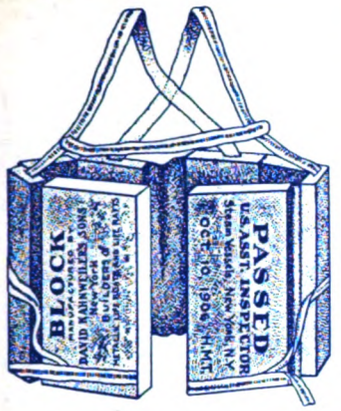


Solid Block Cork Life Preservers

Warranted 24 pounds. Buoyancy and full weight of Cork and Workmanship as required by U. S. Inspectors.

SAFEST CHEAPEST
SOLID CORK LIFE PRESERVERS
RING BUOYS AND FENDERS

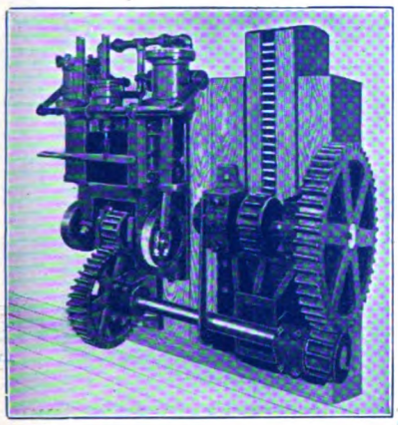
Approved and adopted by U. S. Board of Supervising Inspectors. Also adopted by the principal Ocean, Lake and River Steamer Lines as the only Reliable Life Preserver. Awarded four Medals by World's Columbian Exposition.

METALLIC AND WOODEN LIFE BOATS
METALLIC LIFE RAFT
MARINE DRAGS LYLE GUNS

WICKS' PATENT RELEASING BLOCKS FOR LIFE BOATS

DAVID KAHNWEILER'S SONS

260 FRONT ST., COR. DOVER ST. NEW YORK CITY



Anchor Hoist Engines and Lock Plates

for Operating Dredge and Drill Boat Anchors

Double 6" x 6", 7" x 9" and 9" x 10" Throttle Reverse Engines

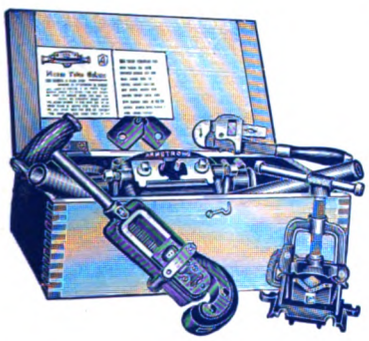
With Gearing to suit the size of Anchors

The Hoist is compact and efficient, and occupies no deck room. Any arrangement can be made to suit local conditions.

We build the engines with either throttle or link reverse, as well as non-reversible and for a great many purposes.

—BUILT BY—

Superior Iron Works Company, SUPERIOR, WIS.



ARMSTRONG COMBINATION KITS

CONSISTING OF

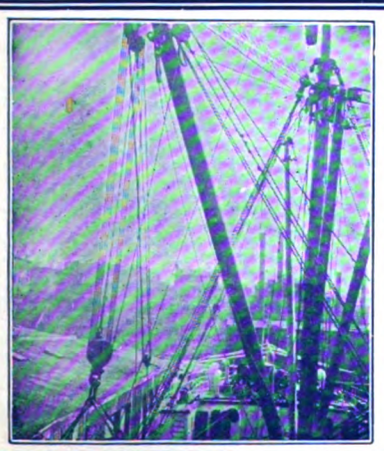
1 No. 2 Genuine Armstrong Stock	¼ in. to	1 in. R
1 " 1 Model B Pipe Cutter	⅛ "	1¼
1 Junior Hinged Pipe Vise	⅛ "	1¼
1 10 in. Stillson Wrench	⅛ "	1

STOCKS ARE FITTED WITH BARD ADJUSTABLE BUSHING
IN A HARD WOOD CASE
ENGINEERS AND FITTERS APPRECIATE THIS KIT.

Manufactured by

THE ARMSTRONG MFG. CO.

296 Knowlton St., BRIDGEPORT, CONN.
NEW YORK, 248 Canal St.



Durable Wire Rope Co.

93-95 Pearl St., Boston, Mass.

Durable Wire Rope will **Not Rust** or **Rot** and is not affected by **Salt Water** or **Climatic Conditions**

FOR

Mooring Lines	Towing Hawsers	Stevedoring	Tiller Ropes
Ship Rigging	Dredging	Boat Falls	Yacht Rigging
Hoisting	Coal Pockets	Pile Driving	Fasts

BRANCH OFFICES

165 W. Lake St., Chicago, Ill. ***701 St. Clair Ave. N. E., Cleveland, O.***

NEW YORK AGENTS: HEGEMAN & WARD, 43 SOUTH STREET

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Hyde Windlass Company

BATH, MAINE

—Manufacturers of—

Windlasses, Steering Gears, Winches, Capstans and other Marine Auxiliaries

HAND, STEAM AND ELECTRIC

Bronze and Iron Propellers

8 inches to 20 feet in diameter

TRADE PENBERTHY MARK.

AUTOMATIC INJECTOR

No other INJECTOR on the market so simple, reliable or durable.

800,000 Engineers testify as to its merits. WORLD'S STANDARD.

The Penberthy Automatic is absolutely so, it is re-starting, self-draining. It is the ideal Injector for Marine use.

"XL--96" EJECTOR

On account of the great elevating and lifting power of the "XL-96" when using a minimum amount of steam, it is at its best when replacing the bilge pump.

Our No. 27 Catalog tells of these. Write for it—Now.

Penberthy Injector Co.

DETROIT, MICH.

Canadian Factory—Windsor, Ont.

Position Always a Certainty With a

Cummings Engine Log

For

Dead Reckoning

May be installed anywhere on ship. Invaluable in fog. Installations on 48 ships.

Reckoning Not Disturbed When Ship Slows Down or Stops

Hands keep accurate record of distance run, based on revolutions of propellers.

Description upon request

Cummings Ship Instrument Works

110 High Street Boston, U. S. A.

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THE MARINE REVIEW

VOL. 46 CLEVELAND JUNE, 1916 NEW YORK No. 6

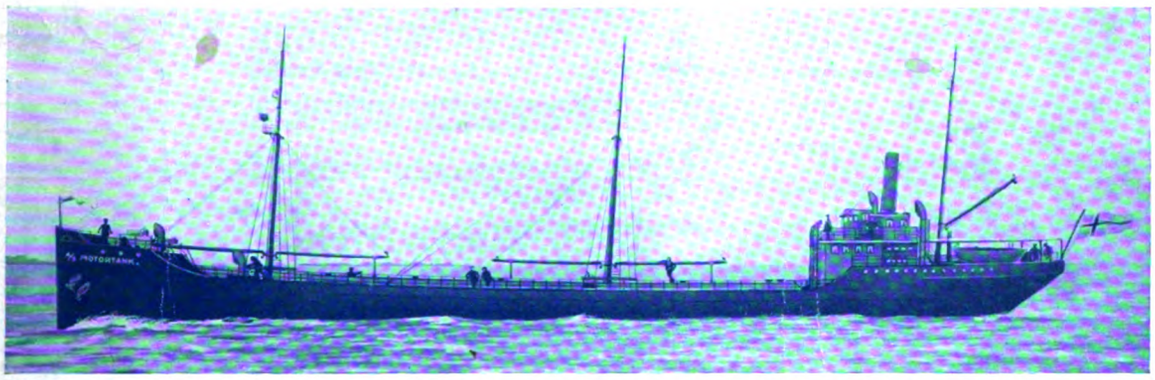
"BOLINDERS"

the only

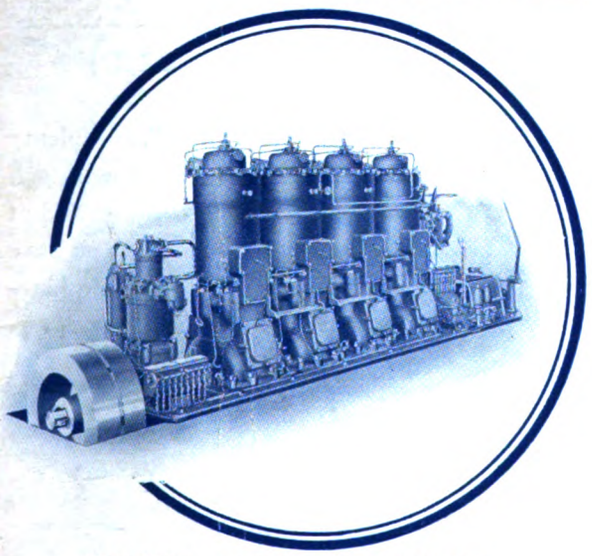
TRUE DIRECT REVERSIBLE

MARINE OIL ENGINE

The Bolinder, in addition to being an engineering proposition, is enabled to lead the Internal Combustion Hot Bulb Marine Oil Engine World for design, workmanship and material. Present installations amount to 400,000 B. H. P.; sales and yearly output, 70,000 B. H. P. ∴ ∴



Vacuum Oil Co.'s Tanker "Brammel Point"—Fitted with 1500 B H. P. Bolinders.



"M" TYPE — 4 Cyl. 240, 320 and 500 B. H. P.
2 Cyl. 120 and 160 B. H. P.
"E" TYPE — 2 Cyl. 10 to 80 B. H. P.
1 Cyl. 5 to 80 B. H. P.

SOME OF BOLINDERS U. S. A. INSTALLATIONS

Building Baltimore	4	vessels,	each,	1500 B.H.P.
Chas. F. McCormick	3	"	"	640 "
Manitowoc Shipbldg. Co.	2	"	"	640 "
A. O. Andersen & Co.	2	"	"	640 "
E. K. Wood Lumber Co.	1	"	"	640 "
The Texas Co.	1	"	"	640 "
Standard Oil Co.	6	"	"	320 "
Standard Transp't'n Co.	1	"	"	320 "
Andrew Mahoney	3	"	"	320 "
Matson Navigation Co.	1	"	"	320 "
R. P. Rithett	1	"	"	320 "
Pendleton Bros.	1	"	"	320 "
Shell Oil Co.	1	"	"	320 "
Carmela	1	"	"	320 "
W. R. Grace & Co.	1	"	"	320 "
W. & S. Job & Co.	1	"	"	320 "
J. B. King & Co.	1	"	"	320 "
Honolula Iron Works	1	"	"	240 "
W. & S. Job & Co.	1	"	"	160 "
Borden & Lane	1	"	"	160 "
Marie L. Hanlon	1	"	"	160 "
A. J. West	1	"	"	160 "
Eclipse	1	"	"	160 "
Pilar	1	"	"	160 "

BOLINDERS COMPANY 30 Church St. NEW YORK

Alphabetical List of Advertisers, page 72 Contents, page 5 "Where-to-Buy," page 62 Classified Advertisements page 71

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Morison Suspension Boiler Furnaces

For Land and Marine Boilers

Uniform Thickness **Easily Cleaned** **Unexcelled for Strength**

Also FOX CORRUGATED FURNACES

Manufactured by

THE CONTINENTAL IRON WORKS

West and Calyer Sts., BOROUGH OF BROOKLYN, N. Y.

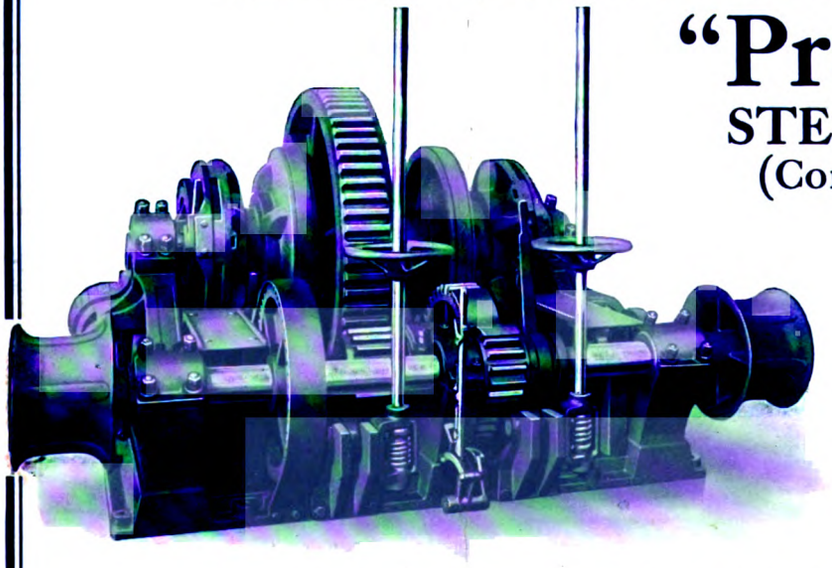
Greenpoint Ferry from East 23rd Street, New York

"Having a PULL means having a friend in power who will act as a steam windlass for you." The

"Providence"

STEAM WINDLASS

(Compound Spur Gears)



has another kind of *pull*, and plenty of it. It has 15 per cent more *pull* than the worm geared types and at 50 per cent faster speed. You have been looking for just this combination. Our price will please you, too.

Write us today.

AMERICAN ENGINEERING COMPANY

SUCCESSORS TO AMERICAN SHIP WINDLASS CO. AND WILLIAMSON BROS. CO.

MACHINISTS AND FOUNDERS

PHILADELPHIA

15-312

Please mention THE MARINE REVIEW *when writing to Advertisers*

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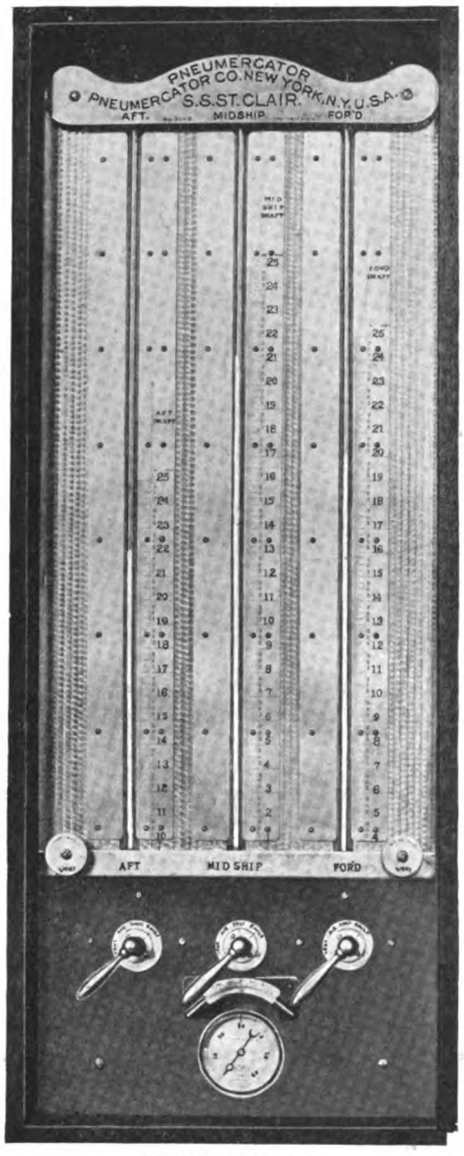
Let Us Help You Increase Your Earnings!

A forward, midships and aft draft Pneumercator, located in the pilot house, is guaranteed to indicate the drafts of the vessel, day or night to within one-half inch — one Lakes' Captain says one-fourth inch.

There are no floats, diaphragms, or electrical connections of any kind to get out of order or repair. The instrument in itself provides a positive proof of the accuracy of the readings given—it is practically foolproof.



Model D-I Special

The Captain knows instantly, his draft, trim, and list at all times. He can load to capacity without fear of overloading. He can trim to an even keel for passing through the canals. He can carry more cargo per voyage at no additional cost, thereby increasing **your** earnings.

We quote the following from a letter received from the Traffic Manager of a Company which has installed five of these instruments:

"Since fitting these vessels with the Pneumercator we have carried much more cargo on the same reported drafts and at no extra expense than before. We believe that this is due to the fact that the Master knows the exact draft of his vessel while loading and can therefore load to the full capacity while at the same time guard against over loading. We find the instrument is of the greatest importance in loading or bunkering at night, or in windy weather when the water is agitated and it is impossible to read the draft marks on the stem and stern correctly."

Other Models of the Pneumercator for Ballast, Fuel Oil, and Service Tanks

PNEUMERCATOR COMPANY, Inc.

118 Liberty Street, New York

—OR—

ORLANDO SUMNER, 4 Bedford Chambers, Covent Garden, London
ALEXANDER HYND, 872 Rockefeller Building, Cleveland, Ohio
G. E. LAWRENCE, Bullitt Building, Philadelphia, Pa.
J. C. H. FERGUSON, Monadnock Building, San Francisco, Cal.

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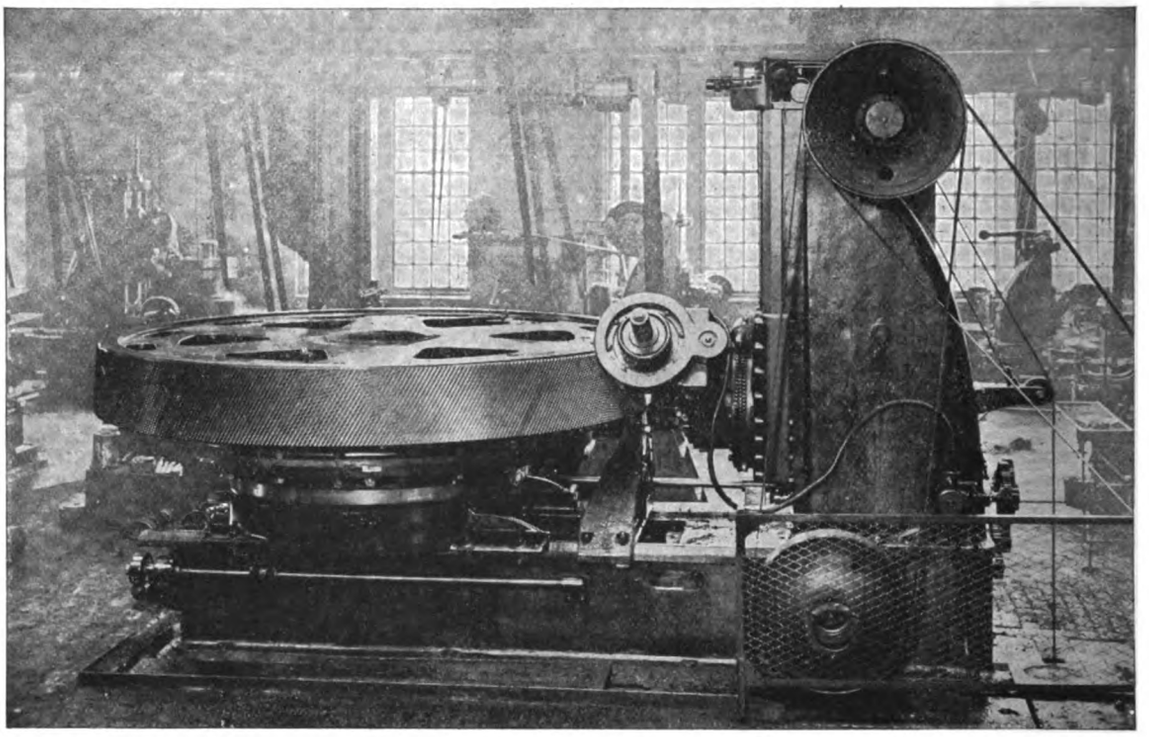

11000 H. P. Westinghouse Marine Reduction Gear in Hobbing Machine, Speed Reduction *3600* to *200* RPM.

Westinghouse Marine Reduction Gears

The engineering and commercial advantages of Westinghouse Geared Turbines for ship propulsion, as compared with either direct connected turbines or reciprocating engines, are mainly:

Increased propeller efficiency
Increased turbine efficiency
Reduced space and weight of machinery
Reduced cost of upkeep.

The Westinghouse Machine Company

East Pittsburgh, Pa. - Washington, D. C.

HUNT, MIRK & COMPANY

San Francisco - Seattle

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